The RUBBER AGE

February, 1944

RIO RESIN

•

Among the criticisms of GR-S products after aging or over curing are,

Too Much Loss in Elongation

and

Too Much Increase in Hardness

These defects are accompanied by poor flexing and bad cracking and tearing properties.

All of these characteristics are today being satisfactorily improved, in some GR-S goods, by the proper use of RIO RESIN.

•

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York City

Newsletter No. 2
FEBRUARY, 1944

Published by Rubber Chemicals Division of DU PONT

Du Pont Accelerators and Special Chemicals for GR-S

IN PROCESSING the great tonnage of GR-S that is becoming available this year it will be necessary to utilize all of the rubber chemicals, and particularly organic accelerators, that can be made. During the past two years we have investigated the action of du Pont rubber chemicals in GR-S and find that many of them are very effective. Those that appear most interesting are listed here with a brief comment regarding their functions in GR-S.

2-MT—is a medium fast accelerator for GR-S. Particularly recommended in tire and belt stocks to which it imparts high resilience and low hysteresis. Best results generally obtained when activated with Accelerator 808, Accelerator No. 8 or Vulcanex. High ratios in the carcass produce cool running characteristics, and low ratios in the tread result in inherent resistance to crack growth. Accelerator 2-MT appears to be especially good in GR-S wire compounds.

ACCELERATOR NO. 8 — (formaldehyde-para-toluidine), an excellent secondary accelerator. Use of 1 to 2 parts as activator with a thiuram or thiazole results in non-persistent acceleration.

ACCELERATOR 808—a non-persistent accelerator when used alone and a powerful activator for 2-MT, Thionex, Tetrone, thiazoles and Zenite; an effective processing aid for GR-S stocks.

VULCANEX—activates cure of primary accelerators such as Zenites, Thionex and 2-MT and due to non-persistency results in vulcanizates having improved stability under heat aging service.

ACRIN—a self-activated thiazole accelerator. Requires no booster in GR-S.

MBT—a quality accelerator for GR-S giving improved results when activated with Accelerator 808, DPG or Thionex.

MBTS—similar to MBT but produces stocks having greater processing safety. A beneficial retarder-activator for Thionex-low sulfur compounds.

ZENITE—an outstanding accelerator for GR-S tire stocks. Activation with DPG, Accelerator 808, Vulcanex or Thionex results in faster rate of cure. Zenite-Vulcanex accelerated stocks have excellent resistance to heat aging and crack growth.

ZENITE A—a fast but non-scorchy accelerator for GR-S stocks, can be activated similar to Zenite.

ZENITE B—the outstanding single accelerator for GR-S tire stocks. Requires no activation. Widely used in camelback because of stability and long curing range imparted.

TETRONE—a thiuram tetrasulfide that may be used to vulcanize GR-S without added sulfur. Produces stocks having excellent resistance to heat aging. When activated with Accelerator 808 or used with added sulfur, Tetrone acceleration is valuable for CV cured wire compounds, boot and shoe stocks and articles which are cured at low temperatures.

THIONEX—is the preferred general-purpose accelerator for GR-S. Thionex imparts to GR-S the unique combination of extreme processing stability, very fast rate of cure at temperatures of 274° F. or above and a long flat curing range. The use of a relatively high ratio of Thionex to sulfur or activation with Accelerator 808 results in vulcanizates having non-persistent characteristics and excellent resistance to heat embrittlement.

DPG—DOTG—the guanidines are very weak accelerators for GR-S but are important as activators for the thiazoles and thiurams.

BARAK—although ineffective when used alone, is a strong activator for 2-MT, MBT, MBTS and the Zenites.

RETARDER W—promotes processing safety of thiazole and thiuram accelerated stocks but is a mild activator at curing temperatures of 260° F. or above. Functions in GR-S as in rubber. Believed to improve resistance to flex cracking in GR-S stocks.

COPPER INHIBITOR X-872-A—inhibits the catalytic effect of copper on the oxidation of GR-S vulcanizates.

RPA NO. 5—softens GR-S chemically with resultant saving in breakdown time and increase in masticating capacity. Stocks mix faster with less power consumption and at lower temperatures when RPA plasticized GR-S is used.

UNICEL—imparts uniform cell structure and a higher degree of blow to GR-S sponge than other blowing agents. Less plastication of the elastomer is required to obtain satisfactory results.

HELIOZONE—imparts excellent sun checking resistance to GR-S products; should be used in all GR-S stocks exposed to sunlight in non-dynamic services.

COLORS—The use of colors in GR-S is increasing. The special GR-S—ST should be used to obtain the minimum amount of discoloration or staining of light and colored stocks. Proper blends of the following clean, light-fast colors will produce any desired shade or tone in the visible spectrum:

RUBBER RED WRT
RUBBER RED 2B
RUBBER ORANGE F
RUBBER YELLOW G
RUBBER MONASTRAL FAST GREEN GS
RUBBER MONASTRAL FAST BLUE CP
RUBBER MONASTRAL BLUE YDE

NEOPRENE LATEX DRUMS—Rinse and return neoprene latex drums promptly. They are badly needed for shipments. We will pay return freight east of the Mississippi and the ceiling price.

DU PONT CHEMICALS FOR NEOPRENE TYPE GN AND GR-M

NEOZONES A AND D . . . for improved aging.
AKROFLEX C . . . for better heat resistance.
PERMALUX . . . for acceleration; improves resilience.
SODIUM ACETATE (60% Granular)* . . . a strong retarder at processing temperatures; slight activation at curing temperatures.
MBTS . . . for mild retardation and plasticization.
ACCELERATOR 552 . . . for plasticization; seldom required with present neoprene.
UNICEL . . . a blowing agent for making sponge.
HELIOZONE . . . for improving the inherently good sunlight resistance of neoprene.
AQUAREX D, AQUAREX MDL PASTE, AQUAREX DN PASTE — these three Aquarexes are interchangeable with each other as mold lubricants and neoprene latex dispersing and stabilizing agents.

*Sodium Acetate is sold by Electrochemicals Department and Grasselli Chemicals Department, E. I. du Pont de Nemours & Co., Empire State Building, New York, New York.

Back the Attack with War Bonds

DU PONT

RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . *Through Chemistry*

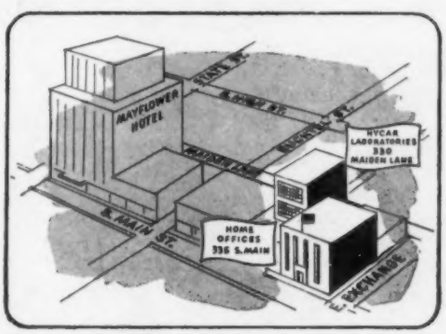
THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York 19, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. February, 1944, Vol. 54, No. 5

Add 108 years to your synthetic rubber experience

THE technicians of Hycar total 108 years of successful experience in synthetic rubber.

These men have developed thousands of new synthetic rubber compounds to meet special problems faced by almost every industry.

All this experience is yours through our Customer Service Laboratory. What can we do to help? Remember that up to 25 pounds of Hycar a month is available to you for experimental purposes without WPB allocations.



Location of Hycar Office and Laboratory

Hycar

LARGEST PRIVATE PRODUCER OF BUTADIENE TYPE

Synthetic Rubber

HYCAR CHEMICAL COMPANY.....AKRON 8, OHIO

THE SIGN OF THE MOST COMPLETE LINE OF ZINC OXIDES

• The Sign of the most complete range of zinc oxide particle size characteristics — ranging from the colloidal dimensions of Kadox to the relatively coarse Horse Head XX Red-78.

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• The Sign of zinc oxides made under three different processes—American Process, French Process, Palmerton Process — in order to impart special properties to meet a variety of special rubber requirements.

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MORE NAFTOLEN!

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CAREFUL COMPOUNDING for Perfect Processing

20 years' experience in our plant guides this workman as he compounds the solution used in Climco Processing.

This solution forms a tough, flexible glaze on the liner fabric that guarantees better separation and ends stock adhesions. This eliminates liner cleaning and repairs. It also prevents gauge distortion, and greatly increases the life of liner fabric.

These *proven* advantages explain why Climco Processing has been overwhelmingly preferred in the industry for over 22 years.

THE CLEVELAND LINER & MFG. CO.
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CLIMCO

CLIMCO PROCESSED LINERS

For Faster, Better Production at Lower Cost

LINERETTE
INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

Precision Chemicals for Rubber and Plastics Compounding

TIME is a division of mathematical exactness. Movement of the stars, the sun and the planets is in precise order. . . There is no guess in the calculations that divide the day. . . Nor is there any guess in the tests by which precise uniformity is established on Standard Resins. . . Knowing **exactly** what to depend on for uniform compounds — their manipulation, quality, color — is an assurance that helps vitally in today's production problems.

In Para Coumarone Indene Resins Standard **precision** has simplified the designation of types so that you can quickly determine **exactly** those best suited to compounding needs. . . For instance —

For light colored compounds (color range 2-3)	For dark colored compounds (color range 12-14)
PICCO 10	**BUNAREX 10**
PICCO 25	**BUNAREX 25**
PICCO 100	**BUNAREX 100**

Number denotes melting point Centigrade

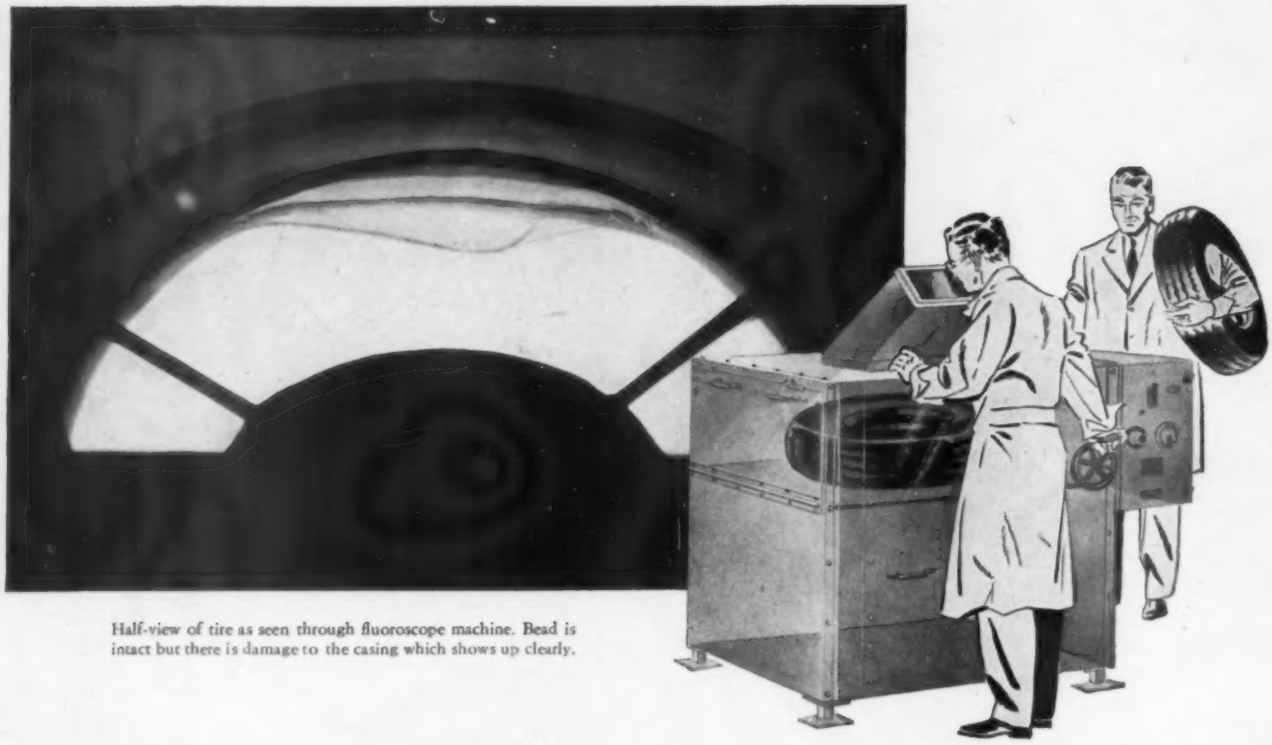
If intermediate colors and melting points are required for special purposes, we can supply them.

These Resins are manufactured by the Pennsylvania Industrial Chemical Corporation.

STANDARD *Chemical Company*

General Offices: AKRON 8, OHIO

The wire in a tire gets the once-over



Half-view of tire as seen through fluoroscope machine. Bead is intact but there is damage to the casing which shows up clearly.

THIS is a powerful fluoroscope machine installed at National-Standard to analyze bead construction. It has paid for itself many times over, because with its help we can literally *see* some of the reasons why bead failures occur (although failure is practically unknown when National-Standard bead reinforcing material is properly used).

We don't pretend that this machine has divulged all the answers. We do know that working with tire company engineers and the fluoroscope, we have been able to give specific reports on the tensile strength and elongation of beads in their own tires and thereby recommend changes in such things as bead construction and tire storage that have materially reduced failures and saved thousands of dollars for many companies.

Other products, too, get the once-over from National-Standard's fluoroscope. Flat and V-belts, tubing and hose—wherever wire is used in rubber or where its use may make a product more efficient. Facilities such as the fluoroscope, and our entire engineering and research staff are at the disposal of rubber manufacturers in solving any current or future problems. Why not call on us if help is needed?

NATIONAL STANDARD Company

Divisions of National-Standard Company

NATIONAL-STANDARD	ATHENIA STEEL	WAGNER LITHO MACHINERY	WORCESTER WIRE WORKS
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TIRE WIRE, FABRICATED BRAIDS AND TAPE	• FLAT, HIGH CARBON STEEL	LITHOGRAPHING AND SPECIAL MACHINERY	• ROUND STEEL WIRE, SMALL SIZES

It has to be *Right*

Alone in his "office" in the skies, the navigator makes his observations, consults his tables, plots his position. Just a line—a simple line—marks the course. But *it has to be right* . . . the success of an important mission, the return of a bomber and its crew depend on its accuracy.

Columbia chemicals have to be right, too. Frequently they are used in operations involving the conversion of raw materials. In other cases they may enter into only one phase of a complicated manufacturing process, and pass off when their task is completed. But always they must be of a standard that assures the correct form and quality of the finished product.

This is why Columbia exercises infinite care in supplying chemicals which conform to the precise needs of its customers.

PITTSBURGH PLATE GLASS COMPANY
COLUMBIA CHEMICAL DIVISION
GRANT BUILDING, PITTSBURGH (19), PENNSYLVANIA

Chicago • • • Boston • • • St. Louis • • • Pittsburgh • • • New York • • • Cincinnati
Cleveland • • • Minneapolis • • • Philadelphia • • • Charlotte

COLUMBIA SPOTLIGHT

IN COLUMBIA LABORATORIES, research continues on those two amazing pigments, SILENE EF and CALCENE. Rubber compounders will be interested in new data dealing with the evaluation of mixtures of both pigments in a GR:S composition . . . and a comparison of accelerators and accelerator-sulfur combinations in Silene EF-GR:S compositions. Both reports are compiled in a single bulletin—No. 43-3—free on request.

DEEPEST LIMESTONE MINE in the world—2323 feet—was sunk last year by Columbia less than two miles from its plant at Barberton, Ohio. Among its many unique features is semi-automatic hoisting which attains top speed of 2,000 feet per minute.

THE NATION is facing a highly critical situation in domestic freight transportation, the O. D. T. warns in a plea for the cooperation of every shipper. Be sure your shipping and receiving departments understand that the handling of railway equipment with all possible speed is vitally important to our war effort.

NOW IT CAN BE TOLD . . the largest Chlorine-Caustic Soda plant built as a single unit east of the Rockies—a Defense Plant Corporation project—is being operated by Columbia at Natrium, W. Va.

A REVISED EDITION of Columbia's Products Booklet is now ready for distribution. A handy reference of products, grades, package units, uses of all Columbia products. Write for free copies.

COLUMBIA CHEMICALS

Soda Ash • Caustic Soda • Liquid Chlorine • Sodium Bicarbonate • Silene EF (Hydrated Calcium Silicate) • Calcium Chloride
Soda Briquettes • Modified Sodas • Caustic Ash • Calcium Hypochlorite • Phosflake • Calcene (Precipitated Calcium Carbonate)

A new *Thiokol** SYNTHETIC RUBBER

TYPE ST

TO the familiar solvent resistance characteristic of all types of Thiokol synthetic rubber, Type ST adds a *new* and outstanding advantage —greatly increased resistance to cold flow.

A second important characteristic of Thiokol ST is its excellent flexibility at low temperatures —a property obtained without the addition of liquid plasticizers. This feature is of particular interest in aircraft applications, where liquid plasticizers may be extracted by aviation fuels and hydraulic brake fluids.

Easier processing and improved odor characteristics are other advantages of the new material.

Write for full information on Thiokol ST.

THIOKOL CORPORATION, *Trenton, N. J.*

Manufacturers of THIOKOL* SYNTHETIC RUBBER *and* RUBBER CHEMICALS

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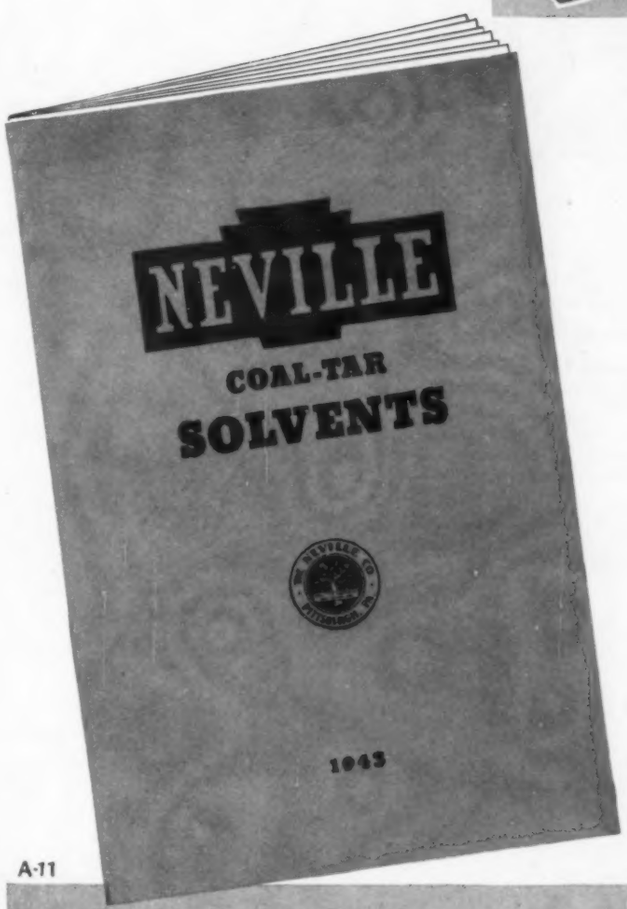
NEVILLE *Solvents*



Experience has proved that coal-tar solvents are the most desirable for many difficult solvent problems. Neville has developed not only uniformly excellent solvents of standard distillation ranges, but also a number of new fractions. Neville offers a complete range of Coal-Tar Solvents to meet the widely varying requirements of Industry.

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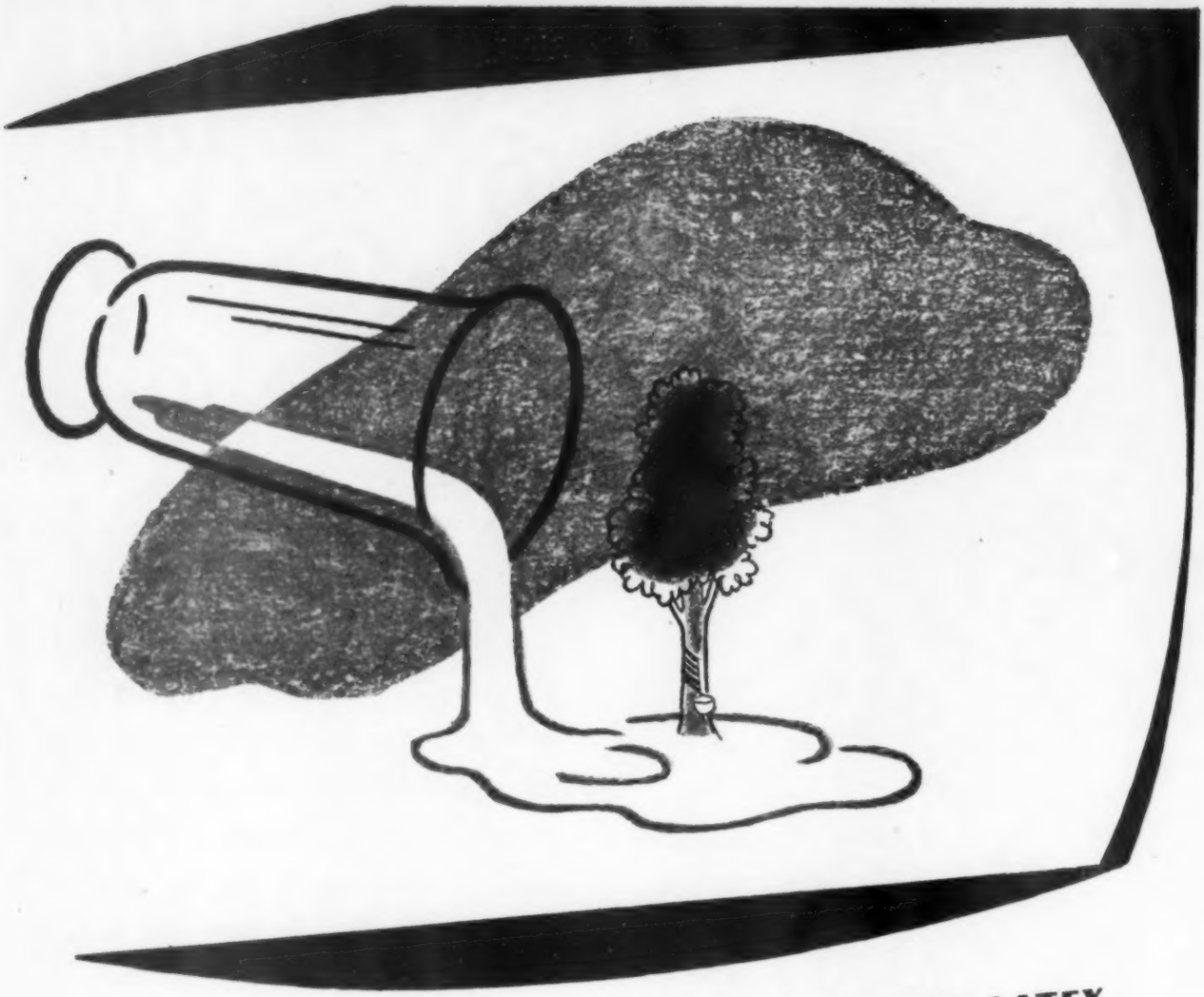

DOES THE SHORTAGE OF CRUDE RUBBER AND LATEX PRESENT A MANUFACTURING PROBLEM TO YOU?

If you are faced with reduced production or a shut-down due to the limitations of rubber and latex, it is likely that we have, or can develop for you, a water-dispersed elastomer or composition that will meet your specific need for an economical rubber-like material. Let us know what your requirements are.

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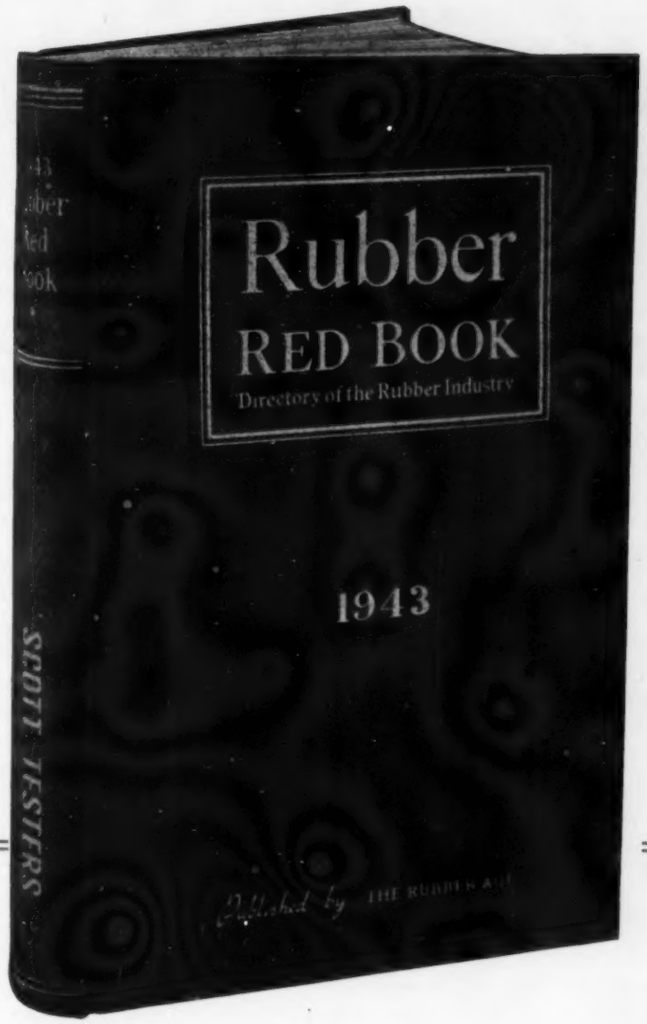

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The INDISPENSABLE REFERENCE BOOK for Rubber Manufacturers, Suppliers, etc....

To rubber factory executives, purchasing agents, technologists, etc., the RUBBER RED BOOK furnishes complete and handy lists of suppliers of all kinds of materials, equipment and services classified for easy reference. This is a service which saves buyers much time and effort as in no other directory are such lists available.

Suppliers and their salesmen, on the other hand, find the RUBBER RED BOOK invaluable for its complete and accurate listing of rubber manufacturers in the United States and Canada with such data as size of company, type of products made, names of buyers and other executives, etc. Also included is a geographical breakdown of rubber manufacturers in the United States showing all companies in each city and town. This feature enables salesmen to be certain that no prospect is overlooked.

No matter what position you hold in the rubber industry — factory executive, purchasing agent, chemist, technologist; supplier of machinery, chemicals, rubber, or other materials; librarian; consultant; salesman or user of rubber products—you should have a personal copy of the 1943 RUBBER RED BOOK on your desk or in your brief case ready to give an immediate answer to the thousand and one questions which crop up constantly, particularly during these critical days when accurate information is so essential.

Summary of Contents
1943 RUBBER RED BOOK

RUBBER MANUFACTURERS IN THE UNITED STATES
Alphabetical Section; Classified List of Rubber Products; Geographical Section.

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ACCESSORIES AND FITTINGS
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RUBBER CHEMICALS AND COMPOUNDING MATERIALS
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Classified List; Suppliers and Addresses.

SYNTHETIC RUBBER AND OTHER RUBBER-LIKE MATERIALS

RECLAIMED RUBBER
Manufacturers and Addresses; Article, "Place of the Reclaiming Industry in the War Effort."

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SUBJECT INDEX

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AND
RUBBER COMPOUNDS

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CHEMICALS

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RUBBER SERVICE DEPT.

**AKRON
8
OHIO**

Chemical Uniformity contributes to the wonders of NEOPRENE

It looks like rubber, but it isn't. It has many characteristics of rubber, but effectively resists oil, sunlight, heat and many chemicals. Commercially it's called neoprene.

Neoprene's pre-war uses were numerous in manufacturing parts for the industrial field. Since Pearl Harbor, neoprene uses in fabrication have been widely increased. Because of the unique properties of neoprene it has been given many war jobs, and is doing them well.

Neoprene is mixed with compounding ingredients and vulcanized to form the final product. The successful use of neoprene for peace and war-time projects depends to a great extent upon the uniformity of the chemicals used in compounding and processing it.

One of these is Baker's Magnesium Oxide, Neoprene Grade, made and packaged especially for users of this material. Here, as in many other industries where chemical exactness is paramount, Baker is an important supplier of chemicals to exacting specifications. Baker's chemicals—purity by the ton—have been made for a large number of the nation's leading concerns for the manufacture or processing of numerous products. The roll call of Baker's customers reads like Who's Who in America.

If you have special chemical requirements involving purity to the decimal for war production products or for the anticipated post-war reconversion program, we invite you to discuss your needs in confidence with Baker.

J. T. BAKER CHEMICAL CO.

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CARBON BLACKS
FOR SUPERIOR PROCESSING
QUALITIES IN SYNTHETIC
(GR-S...GR-I...GR-M) COMPOUNDS
ONE OF THESE GRADES IS YOUR BLACK: Continental "AA" low heat generating, easy processing. Continental "A" medium cure, medium easy processing, low extruding. Continental "D" standard.
FOR HIGH CONDUCTIVITY— Continental R-40, and a complete line of color blacks.
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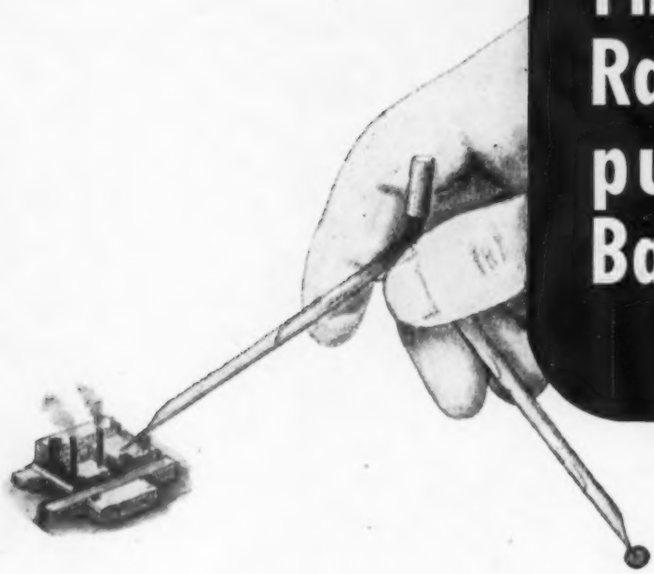
Going Right to the Point in Raising the Output from Your Banburys . . .



Interstate Service combines engineering with skillful rebuilding and understanding of Banbury requirements in the Synthetic processing program. . . This specialized "know how" is going right to the point in correcting production bottle-necks by raising the efficiency and mixing speed of Banburys for the world's largest manufacturers of rubber goods. . . We can help you, too. Write, wire or phone us today.

We need spare Banbury parts. . . If you have any extra parts you will be helping someone else by letting us buy them. They are urgently needed.

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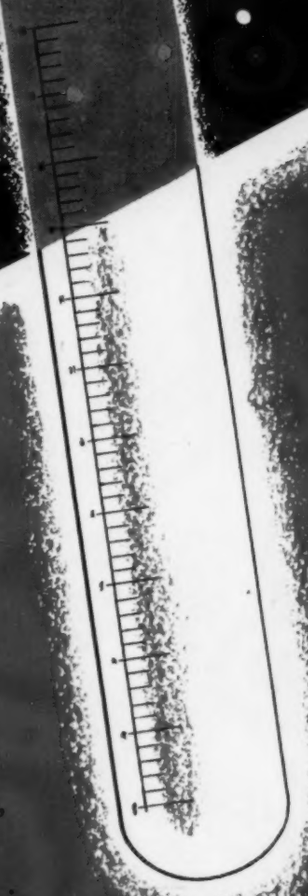
AERO AC 165*



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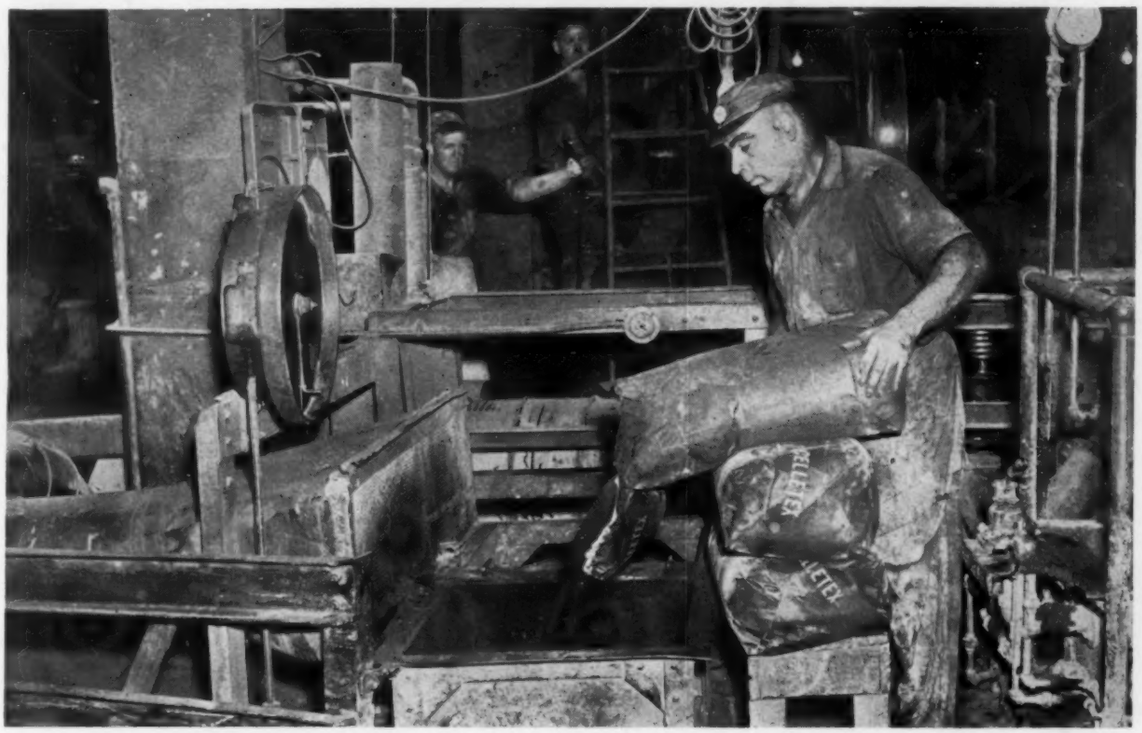

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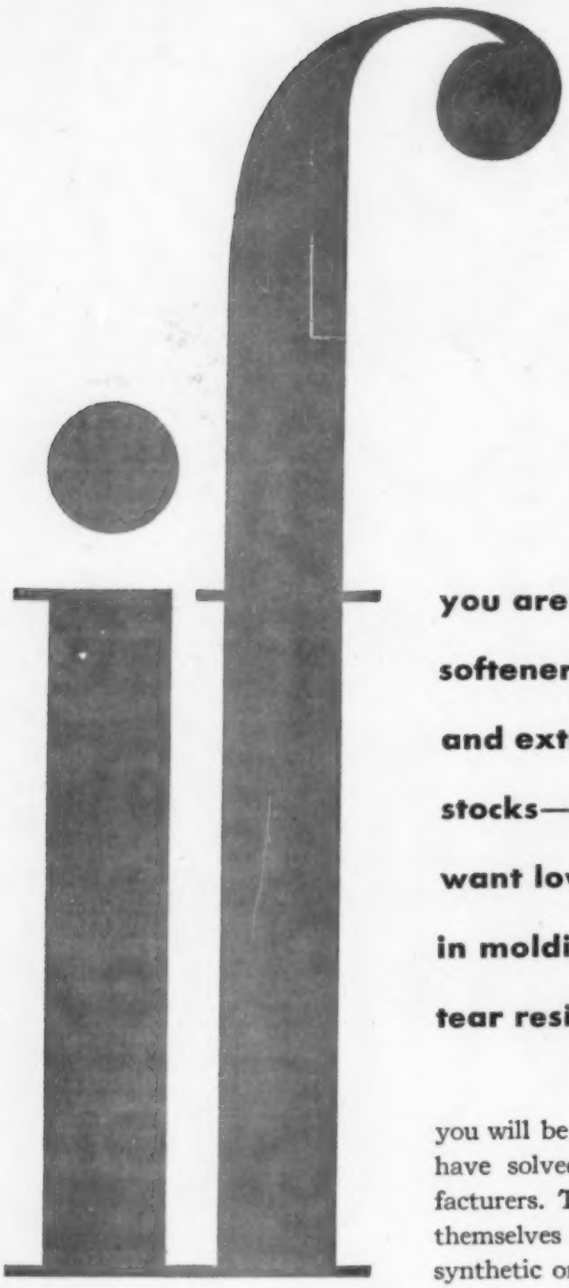

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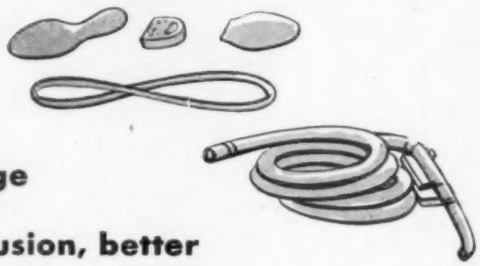

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KOSMOBILE (S-66) DIXIEDENSED (S-66) KOSMOBILE (HM) DIXIEDENSED (HM)	MEDIUM PROCESSING CHANNEL	MPC	94	ACID	11	Standard rubber black for reinforcement, tear and abrasion resistance; tire treads, conveyor covers, soles, heels, molded goods, etc.
KOSMOBILE 77 DIXIEDENSED 77	EASY PROCESSING CHANNEL	EPC	82	ACID	10	Reinforcement of reclaimed and synthetic rubber; synthetic tire treads, synthetic soles and heels, and other GR-S stocks requiring high tensile and resistance to abrasion.
KOSMOS 40 DIXIE 40	HIGH MODULUS FURNACE	HMF	45	ALKALINE	2	Especially adapted for synthetic rubber, for ease of processing, low heat build-up, and resistance to flex cracking; synthetic tire treads, bogie wheels, etc.
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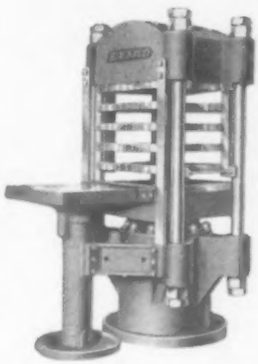

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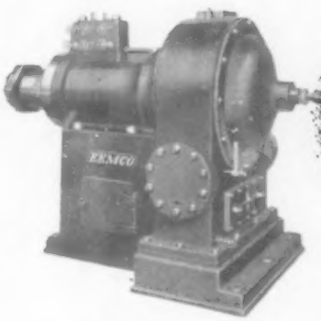
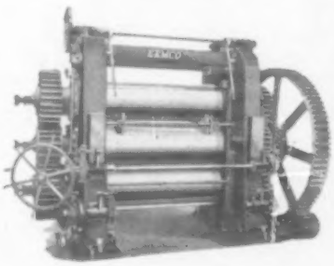


TUBERS

CALENDERS



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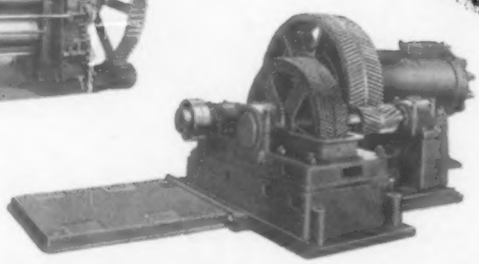

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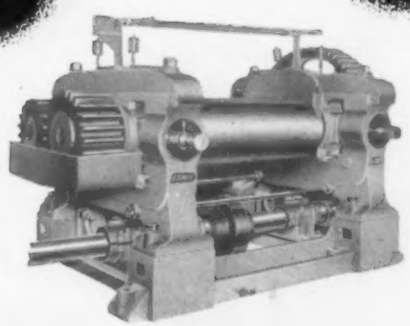

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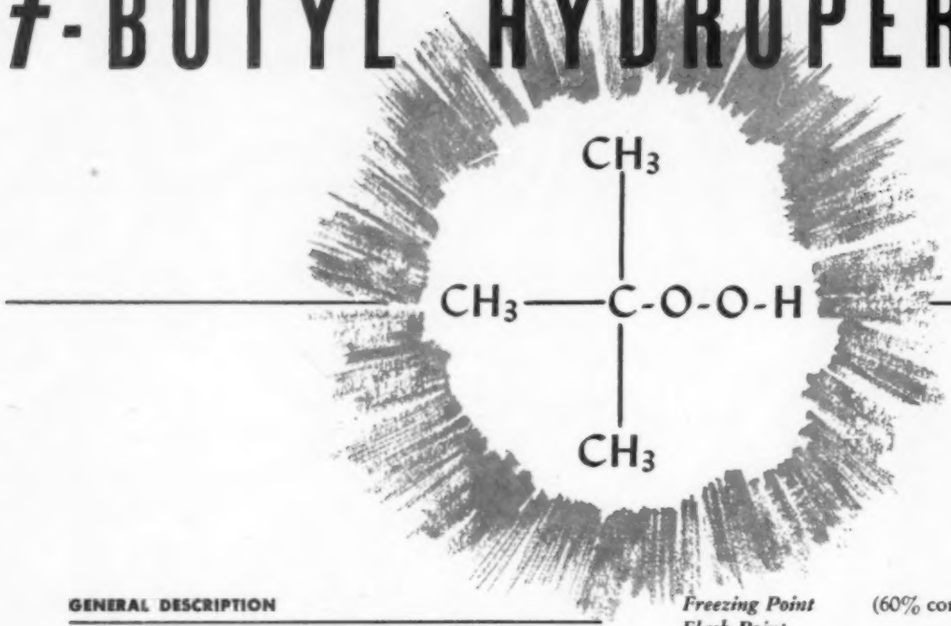

GENERAL DESCRIPTION

t-Butyl Hydroperoxide is a new, organic, alkyl peroxide which offers extremely interesting possibilities. It is standardized at a concentration of 60% (10.66% available oxygen). Use of the proper activators increases the rate of release of the oxygen.

SUGGESTED USES

1. As a catalytic agent in one or two phase polymerizations. **(t-Butyl Hydroperoxide has proved to be an excellent catalyst for polymerizing Styrene, as well as certain Elastomers such as Buna S.)**
2. As a drying accelerator in oils, paints, varnishes, etc.
3. As a combustion accelerator for heavy fuel oils used in Diesel engines.
4. As an accelerator in the curing of synthetic resins.
5. As an accelerator in the vulcanization of certain synthetic rubbers.
6. As an oxidation agent for laboratory purposes.

PROPERTIES

Molecular Weight		90
Specific Gravity @ 25° C.	(60% concentration)	0.859
Boiling Point	"	82–83° C.
Freezing Point	(60% concentration)	−30° C.
Flash Point	"	18.3° C.
Refractive Index @ 25° C.	"	1.3960
Available Oxygen	"	10.66%
Color	"	Water White
pH of 1 part 60% Conc. in 10 parts water		4
Stability		Completely stable up to 76.6° C.
Solubility:	60% concentration in water	11%
	Water in 60% concentration	5%
	In short chain aliphatics	Excellent
	In aromatics	Excellent

ACTIVATORS

Hydroquinone and other similar organic reducing agents have proved to be efficient secondary catalysts in polymerization reactions (when used in quantities up to 0.1% of t-Butyl Hydroperoxide), greatly increasing the efficiency of polymerization. When use requires quick release of oxygen, the same proportions of Hydroquinone mentioned above have proved efficient.

• • •

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*U.S. PATS. 2176407 & 2223807

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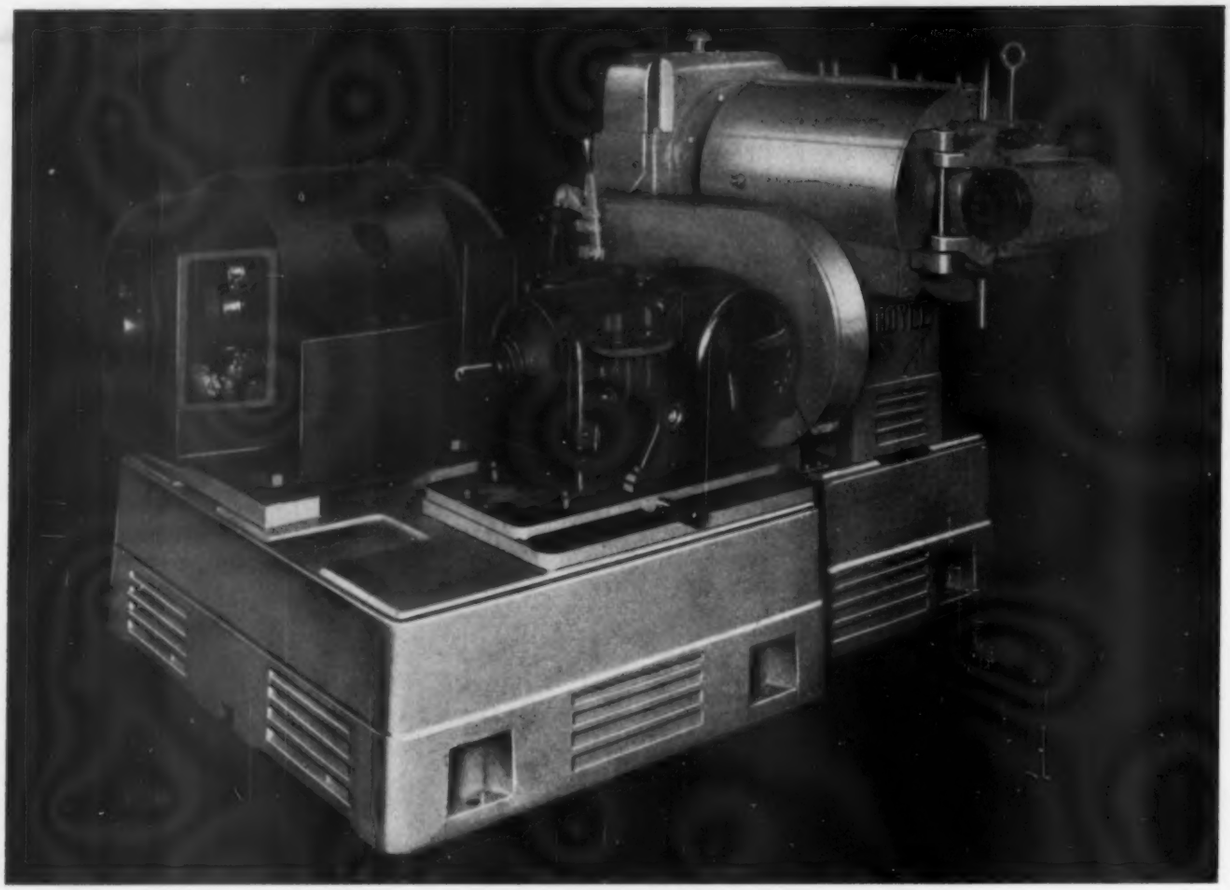

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LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
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The **RUBBER AGE**

VOL. 54, No. 5 **FEBRUARY, 1944**

Latex Compounding of GR-S

By H. F. O'CONNOR and C. W. SWEITZER

Research Labs., Columbian Carbon Co., Brooklyn 32, N. Y.

GR-S is utterly dependent on colloidal carbon for strength. Tensile strength, for example, is improved not by twenty-five percent as in Hevea, but by six hundred percent. In spite of this sensational improvement GR-S develops only two-thirds of the strength of Hevea. It is apparent therefore that a new compounding approach is required to raise the strength of GR-S to Hevea levels. It was largely with this thought in mind that early in 1943 a study on the latex compounding of GR-S was launched in these laboratories.

In spite of the unpromising history on the reinforcement of Hevea by latex compounding, several factors favor latex compounding of GR-S. With the GR-S latex produced domestically, adequate supplies are assured for experimental and development work. With the failure of standard compounding to raise GR-S strength to Hevea levels, there is adequate room for further improvements in reinforcement. Latex compounding also presents a new angle of attack on the problem of the poor high temperature properties of GR-S. Finally, the latex compounding approach offers an excellent means for reducing the total milling time in GR-S compounding.

The studies to date have shown that latex compounding improves GR-S, particularly in stress strain properties and in resistance to high temperature. Typical changes and improvements effected in the properties of GR-S by latex compounding are demonstrated by the results of a carbon loading series study which are reported in detail. The results of other studies, involving principally method of preparation and formulation variables, are summarized briefly.

Latex Compounding Method

In the normal method of compounding GR-S, following the practice used with Hevea, all the compounding ingredients including carbon are added to the dry polymer on the mill. In the latex method of compounding GR-S, part or all of the compounding ingredients are

added to the latex prior to the coagulation and milling steps. Two methods of adding the compounding ingredients to the latex were employed in the present studies. In one a slurry of carbon plus all other ingredients was added to the latex; in the other an aqueous dispersion of carbon only was added to the latex with all of the remaining ingredients added on the mill.

The most satisfactory way to add the compounding ingredients, and particularly carbon, to the latex is in the form of an aqueous dispersion. In the case of carbon a good dispersion is prepared by milling approximately 30% carbon plus 5% dispersing agent (on the carbon) in tap water for 16 hours in a ball mill. This dispersion can be prepared more rapidly and simply in a colloid mill, the method which would be used in any practical application. Satisfactory dispersing agents include sodium hydroxide, ammonia, Darvan No. 1 and No. 2 and Daxad No. 11, with the latter preferred. By this method of addition a uniform non-dusting black crumb results from the coagulation. The addition of dry carbon directly to the latex has given a non-uniform dusty crumb after coagulation, which has unsatisfactory handling, processing and physical properties.

Various coagulants were tried during the course of these studies, including sodium chloride, hydrochloric acid, salt-acid mixtures, zinc chloride and carbon dioxide. Zinc chloride and carbon dioxide were found to give better physical properties than the other coagulants with zinc chloride preferred because of its handling and other advantages. It was also found that superior properties resulted when the coagulum was washed completely free of chlorides. For this purpose a fine crumb had a definite advantage, for example over a mass coagulum.

The latex compounding method, finally worked out as most satisfactory for laboratory use, is described below by the detailed steps involved. This method, in which the carbon alone was added at the latex stage, was used in the preparation of the carbon loading series of compounds described in detail later in the report.

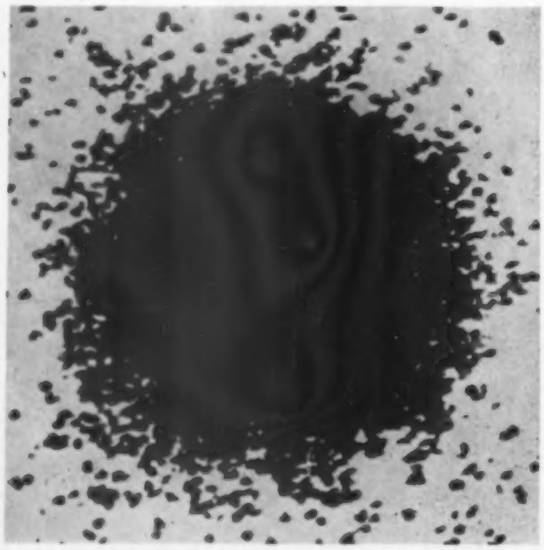

FIG. 1 — Black Latex Crumbs.

In any practical application of the method obvious changes would be made to simplify the somewhat involved laboratory procedure.

(1) A carbon dispersion is prepared by ball-milling, by the method previously described. (Colloid milling is preferred if equipment is available.)

(2) Sufficient carbon dispersion to give the desired loading of carbon on the rubber, and sufficient latex to give 400 grams of rubber, are weighed out separately.

(3) The latex is added to the carbon dispersion with agitation. This takes about 3 minutes. The resultant mix is a uniform black liquid.

(4) This black latex mix is diluted with tap water to a rubber content of about 12%. This is not necessary but it is done to assist the coagulation in the laboratory, since manual agitation is inefficient.

(5) This diluted black latex mix is coagulated by adding the coagulant gradually with vigorous agitation. A rubber-black coagulum is obtained in the form of a fine crumb. The aqueous phase is clear.

(6) The coagulated crumb is transferred to a large container, diluted freely, and allowed to stand for about one hour. This leaching step reduces the time needed to wash the crumb free of chlorides.

(7) The diluted batch is filtered with suction and washed with water until free of chlorides.

(8) The filter cake is pressed free of excess water, broken up by hand and dried in shallow trays in the oven for 12-16 hours at 150° F. The uniformity and fineness of the dry crumb are shown in Figure 1.

(9) The dried crumb is sheeted out on a cold 2-roll mill (80° F.) for 1-2 minutes and immediately compounded with the remaining ingredients. The total milling time involved, about 14-16 minutes, is considered sufficient for this compound.

In the preparation of a complete latex compound the same procedure is used, with the exception that the remaining ingredients are added to the latex via the carbon dispersion and are not added at the milling stage. The control for any latex compounded stock is prepared from dry polymer, obtained preferably from the same batch of latex, by compounding completely in the normal manner on the mill. The milling time required for standard mill compounding is 16-20 minutes.

Formulation

The base compound used throughout these studies was as follows:

GR-S (solids)	100.
Carbon (EPC)	50.
Softener (Bardol)	7.5
Zinc Oxide	5.0
Sulfur	2.0
Mercaptobenzothiazole	1.5
Anti-oxidant (B. L. E.)	2.0
Dispersing Agent	2.5

The GR-S, both latex and dry polymer, used throughout these studies was Type I from the Naugatuck Chemical Division, U. S. Rubber Company. Type I contains the anti-oxidant shown in the base formula above. The latex was analyzed for solids content periodically to assure accurate formulations.

The carbon used throughout was Micronex W-6, an easy processing channel grade (EPC). The loadings varied from 30 to 70 parts in the carbon loading series study, results of which are described in detail. In the other studies discussed the carbon loading was 50 parts.

The dispersing agent was always present in the latex compound but was not always added to the control milled compound. The presence of the dispersing agent

TABLE I—PROPERTIES OF LATEX AND MILL COMPOUNDED GR-S

(Detailed Test Data)

Compound	Carbon Loading	Cure at 293° F. (mins.)	L-300	Tensile	Elong.	T.P.	Shore Hardness After 30″	% Set	% Rebound	Log R	Hot Iron *
Latex	30	45	250	1850	850	157	41	25		10.4	>90″
		60	300	2100	785	165	44	21	59.0	9.9	>90″
		90	450	2125	675	144	47	16		9.9	7″
		135	550	1950	595	116	48	12		10.4	< 1″
Mill	30	45	400	1380	610	84	44	15		9.8	2″
		60	490	1475	570	84	47	14	59.0	9.7	< 1″
		90	540	1525	540	82	48	12		9.7	< 1″
		135	600	1490	515	77	48	9		10.1	< 1″
Latex	40	45	300	2250	840	189	44	31		9.1	>90″
		60	450	2500	755	189	46	30	54.4	8.6	>90″
		90	550	2875	720	207	50	26		8.7	28″
		135	700	2625	645	169	50	18		8.9	5″
Mill	40	45	510	2150	680	146	48	25		8.3	4″
		60	625	2300	640	147	50	21	55.9	8.2	2″
		90	790	2240	580	130	53	15		8.1	< 1″
		135	875	2090	515	107	54	11		8.7	< 1″
Latex	50	45	600	3190	770	246	51	37		7.9	77″
		60	700	3500	735	257	54	34	51.5	7.6	>90″
		90	900	3500	660	231	56	25		7.6	14″
		135	1190	3300	570	188	58	18		8.1	3″
Mill	50	45	780	2610	635	166	54	28		7.4	10″
		60	1020	2610	570	149	56	23	51.5	7.3	5″
		90	1190	2690	530	143	58	17		7.3	< 1″
		135	1225	2450	460	113	59	13		7.5	< 1″
Latex	60	45	690	2400	680	163	53	36		7.5	>90″
		60	1010	2780	605	168	56	29	47.3	7.4	>90″
		90	1175	3300	600	198	60	26		7.3	34″
		135	1360	3250	570	185	60	23		7.6	18″
Mill	60	45	910	2750	610	167	58	28		6.9	32″
		60	1300	2760	525	145	60	22	47.8	6.8	15″
		90	1440	3025	520	157	61	20		6.8	4″
		135	1675	2690	430	116	64	14		7.0	< 1″
Latex	70	45	1240	3210	600	193	62	36		6.8	75″
		60	1500	3125	530	166	64	28	44.6	6.7	39″
		90	1750	3075	475	146	65	22		6.8	16″
		135	1860	3050	445	136	66	19		7.0	15″
Mill	70	45	1310	3175	575	183	64	28		6.5	31″
		60	1660	2990	470	141	65	22	44.6	6.4	20″
		90	1870	2800	415	116	66	15		6.4	2″
		135	2090	2650	365	97	67	12		6.6	< 1″

* **Hot Iron Test Method.** This test provides a simple quantitative evaluation of the heat tenderness, or thermal shortening, of GR-S. As developed in these laboratories ("The Improvement in Thermal Shortening and Fatigue of GR-S Treads," Columbian Carbon Company Bulletin, p. 11, 1943), a T-50 test piece is stretched to a suitable elongation and is then placed in contact with a hot iron, and the time to failure in seconds is recorded. For tire compounds a stretch to 250% and an iron temperature of 400° F. are suitable. The hot iron preferred is a small electric patch heater, modified with a semi-cylindrical heater face.

TABLE II—PROPERTIES OF LATEX AND MILL COMPOUNDED GR-S

(At Optimum Cure)

Compound	Carbon Loading	Opt. Cure at 293° F.* (mins.)	L-300	Tensile	Elong.	T.P.	Tear	Shore Hardness	% Rebound at 180′ Cure	% Set	Log R	Hot Iron
Latex	30	75	400	2145	725	156	Pass.	46	59.0	18	9.9	48″
Mill	30	75	510	1520	560	85	Pass.	48	59.0	13	9.7	1″
Latex	40	90	570	2870	685	196	Pass.	49	54.4	26	8.7	28″
Mill	40	60	640	2300	635	146	Poor	50	55.9	21	8.2	2″
Latex	50	70	760	3515	700	246	Fair	55	51.5	31.5	7.6	65″
Mill	50 †	60	1020	2670	600	160	Pass.	56	51.5	23	7.3	5″
Latex	60	80	1180	3175	610	193	Fair	59	47.3	26.5	7.3	34″
Mill	60	80	1460	3010	535	161	Pass.	62	47.8	21	6.8	8″
Latex	70	45	1240	3210	600	193	Good	62	44.6	36	6.8	75″
Mill	70	45	1310	3175	575	183	Good	64	44.6	28	6.5	31″

* Optimum cures were chosen by hand test as the earliest cure of reasonable snap with substantially unimpaired tear.
† Rubber Reserve Company (United States Rubber Company, its agent) reported the following specifications on the lot of GR-S used in this study:

Formula	WPB Test Compound
Optimum Cure at 293° F.	50′
Modulus	1110
Tensile	2780
Elongation	585

in the control compound had a tendency to depress properties slightly. In the carbon loading series study the dispersing agent was present only in the latex compounds.

Variations in formulation were found to produce the same changes in properties that might be expected in normal mill compounding. Increasing sulfur, for example, raised Shore hardness and rebound, but at the expense of elongation and tear. Increasing softener, from 7.5 to 12.5 parts, was found to give increased elongation and improved resistance to high temperature at overcures with some sacrifice in tensile strength. Similar formulation tests were run with the zinc oxide and anti-oxidant being varied. In summary, these various formulation tests demonstrated the suitability of the base compound shown above for latex compounding studies.

Physical Properties (Carbon Loading Series)

Compared to mill compounded stocks, latex compounded stocks are characterized chiefly by higher tensiles and elongations and greatly improved heat resistance. These and other differences between latex and mill compounded stocks are shown in the series of carbon loading studies for which the detailed stress strain data are set forth in Table I. Properties at optimum cure are compared in Table II and Figure 2.

In this series of studies varied loadings of EPC carbon (Micronex W-6) were used in the base compound. The latex compounded stocks were prepared by the method described, in which the carbon only was added in the latex stage. The mill compounded stocks in this series of studies did not contain the dispersing agent and only in this respect did the formulae for the two compounds vary. The total milling times used in preparing these stocks are shown below:

Carbon Loading	*Total Mill Time (in Minutes)* *Latex Compound*	*Mill Compound*
30 parts EPC.....	14	16
40 parts EPC.....	15	16
50 parts EPC.....	15	16
60 parts EPC.....	15	17
70 parts EPC.....	16	19

It should be pointed out that the total milling time for these latex compounds is relatively high because of the time required to add the softener on the mill.

If the softener is added to the latex via the carbon dispersion the total milling time required is reduced materially. For complete latex compounds a total milling time of 10 minutes has been found adequate.

The results presented in Tables I and II and graphed in Figure 2 lead to the following conclusions:

(1) The reinforcement of GR-S is markedly improved by compounding in the latex form, for all carbon loadings from 30 to 70 percent by weight.

(2) Latex compounding of GR-S gives higher tensiles and better elongations than normal mill compounding at all carbon loadings. This advantage is particularly striking for the 50% carbon compound where the tensile advantage is 845 lbs. and the elongation improvement is 100%. The tensile product for this 50% latex compound is 246, a value within the range shown by Hevea compounds.

(3) The more efficient carbon employment in latex compounding is so striking that the 40% latex compound shows better tensile and elongation properties, combined with better rebound, than does the 50% milled compound.

(4) The optimum tensile occurs at the 50 part loading for the latex compounds while it is still climbing at 70 parts for the milled compounds.

(5) The latex compounded stocks show consistently lower modulus and higher sub-permanent set. Rebound values are substantially equal for both compounds.

(6) The latex compounds are only slightly slower curing on the average than the milled compounds.

(7) Heat resistance properties are markedly superior for the latex compounded stocks as determined by the Hot Iron (H.I.) test.

Discussion

Complete latex compounding, that is, the addition of all the ingredients in the latex stage, was found to give the same improvements in GR-S compounds noted in the tests described in which only the carbon was added in the latex stage. In the few direct comparisons made between the two methods, the completely formulated latex compound showed substantially similar physical properties. The carbon latex method is preferred however because it permits greater flexibility in compounding. The results lead to the conclusion that in latex compounding the important step is the addition of the carbon in the latex stage. For this step well dispersed carbon is preferred.

The carbon dispersion in the black latex crumb is improved by subsequent milling on the 2-roll mill. The time required to add the remaining compounding ingredients on the mill (about 14-16 minutes) is usually sufficient to give satisfactory carbon dispersion. The degree of dispersion obtained is judged to be superior to that shown by the corresponding control milled compounds, on the basis of visual examination of the stocks.

The latex compounding method therefore could be defined as a new two-stage compounding process, in which the first stage involves intimate mixing of latex and carbon in dispersion form, and the second stage involves milling of the coagulated latex-carbon crumb, for less than normal time and at less than normal temperature, to give a final stock of superior carbon dispersion. The first stage makes possible the improved dispersion in the second stage. The beneficial effects from latex compounding result then from this two-stage process.

The effect of the improved dispersion, resulting from this two-stage process, would be to promote a more continuous carbon phase. This condition produces the following changes in the properties of latex compounded GR-S, which have already been noted, *viz:*

(1) Improved reinforcement,

(2) Higher elongation and lower L-300, indicating less carbon flocculation, and

(3) Higher set, which always improves both heat embrittlement and cut growth properties.

It seems probable that the beneficial effects resulting from the addition of carbon to the latex are also tied up with the well-known bad effect of heat, prior to vulcanization, on the properties of GR-S. In the normal milling method GR-S is subjected to Banbury or mill heat before the carbon is dispersed in the rubber. On the other hand, in the latex method, the carbon is mixed or dispersed into the latex without the development of heat. Subsequently the dispersed carbon may exert a "protective" action on the GR-S polymer during the coagulation, drying and milling stages, possibly by inhibiting to some extent excessive cross-linking of the polymer chains.

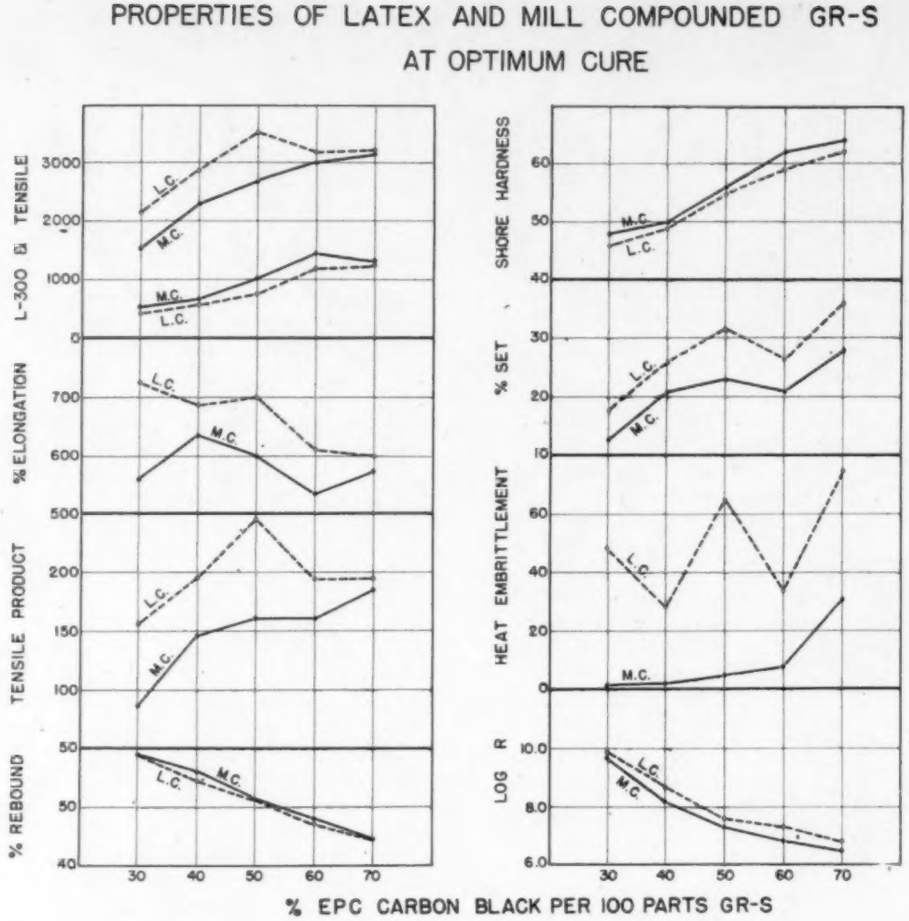

FIG. II.

It is interesting to note also that the property changes for latex compounded GR-S lie definitely in the direction of Hevea properties. This is true for the improved stress-strain properties (tensile, elongation, T.P.), for the higher sub-permanent set and for the remarkable improvements in heat resistance properties without loss in rebound.

Summary

The more important findings in this study can be summarized as follows:

(1) A satisfactory technique has been worked out for compounding GR-S in the latex form, either with carbon alone or with carbon plus the other compounding ingredients.

(2) Latex compounding of GR-S results in notable improvements in stress-strain properties.

(3) Latex compounding of GR-S results in outstanding improvements in heat resistance properties without any loss in rebound.

(4) Latex compounding of GR-S results in lower modulus, higher elongation and higher sub-permanent set. The increased set is significant since it is accompanied by maintained rebound.

Besides giving improved quality latex compounding offers some practical advantages and possibilities. These are listed below:

(1) Latex compounding permits a reduction in the total milling time. This saving amounts to at least 10% for carbon latex compounds and up to 50% for complete latex compounds. The mixing time normally required in the Banbury is certainly not required.

(2) Latex compounding permits cooler handling of the GR-S. Since the carbon is added to the latex at room temperature, no high temperatures are involved during its incorporation as in the case of Banbury mixing.

(3) Latex compounding permits cleaner handling of carbon since it is added to the latex and is therefore mixed in the rubber before milling. If desired the handling of carbon black could thus be transferred in toto to the polymer plants. This offers some interesting possibilities.

(4) Latex compounding to the black crumb stage, followed by sheeting and baling, would provide a convenient and economical means for shipping black, particularly for transoceanic deliveries. There would also be important savings in containers.

(5) The black latex crumb may provide a convenient form of compounded GR-S for extrusion and related operations.

ACKNOWLEDGMENTS

Grateful acknowledgment is made to W. B. Wiegand, Director of Research, Columbian Carbon Company, for many helpful suggestions; to the Office of the Rubber Director for permission to release this paper; to the Naugatuck Chemical Division, U. S. Rubber Company, who kindly furnished the latex and dry polymer for this study; and to Richard A. Parsekian, who performed most of the compounding work.

Toxicity of General Purpose Synthetic Rubbers

THE Division of Pharmacology, Food and Drug Administration, Federal Security Agency, is conducting chronic toxicity and irritation experiments using general purpose synthetic rubbers (GR-S, GR-M and GR-I). An interim report recently made to the Office of the Rubber Director follows:

Procedure

"Because of the physical nature of the products to be tested, we were somewhat limited in the type of experiment that could be set up. We have, therefore, mixed the ground rubbers with the diets and fed them to rats over a considerable period of time. Since some of these synthetics are to be used in surgical equipment, the question arose as to whether they would be tolerated in open wounds, etc. Consequently, the various samples were tested for irritation of the abraded skin of rabbits and for effect after subcutaneous implantation in guinea pigs."

Chronic Toxicity in Rats

"White rats raised in this laboratory were placed on experiment at the age of weaning (21 days). The animals were arranged in groups such that each had litter mate controls and consisted of half males and half females. The diet consisted of ground commercial rat ration with which the finely divided synthetic rubber was intimately mixed. The animals are housed in individual cages with the diet and water allowed ad libitum. The weights of the animals and the food intake are determined at weekly intervals.

"These experiments on rats have been underway from 5 to 9½ months (¼ to ½ the average lifetime). The rate of growth, the average food intake and the present average weights of the animals receiving 1% of the ground rubber in their diet are not different from those of the animals on the control diets. The animals appear in good condition, their furs are normal, and the number of animals dead is not different from the controls."

Irritation Experiments

"Samples of the synthetic materials were tested by a 24-hour patch test technic on both intact and abraded skin of rabbits. None of the samples were irritating to the intact skin. There was a very slight but not significant irritation observed on the abraded skin.

"Small pieces of the synthetic rubbers approximately 2x4x12 mm. were implanted subcutaneously in guinea pigs under general anesthesia. These animals were sacrificed two weeks later and sections of tissue were taken for microscopic examination. This examination showed the sites of implantation to be of a uniform clean appearance, characterized by new fibrous tissue and by minimal amounts of inflammatory cellular exudate, hemorrhage, and deposition of fibrinoid material. There was no giant cell foreign-body reaction."

Conclusions

"Because of the absence of any toxic signs in feeding to rats, the absence of irritation to both intact and abraded skin of rabbits, and the failure to produce foreign body reaction on subcutaneous implantation in guinea pigs with these synthetic rubbers, and provided that no evidence to the contrary develops as we continue our experiments, these synthetic rubbers may be deemed safe for use in seals for food containers, in surgical goods, and in comparable applications where synthetic rubber is not altered in composition.

"You will note that the statement made in this memorandum that these substances are satisfactory for certain purposes is based on the results of our investigations to date and that a proviso is inserted to cover possible developments as the experiments continue."

Toxicity of Antioxidants

"There is one point that might be called to your attention, and that is that in one phase of our correspondence it was indicated that phenyl beta naphthylamine is to be used as an antioxidant in one of the synthetic rubbers. It is known that beta naphthylamine can cause bladder tumors. We have no information as to whether phenyl beta naphthylamine has the same property; it may or may not have. We know of other derivatives of beta naphthylamine which have not so far been demonstrated to have such property and some of them have been rather extensively studied. However, one can avoid criticism and comment if one objects to the use of rubber containing phenyl beta naphthylamine. The suggestion might be made to the manufacturer of this particular rubber that the rubber recommended and submitted to food manufacturers for use in connection with food containers, or to the public for use as jar rings, be made using the alpha naphthylamine and diphenylamine derivatives and not the beta naphthylamine.

"It is possible that the phenyl beta naphthylamine when incorporated into the rubber is no longer present as such; it is also possible that it will not be extracted by the foods, and it is further possible that the quantities if extracted would be so small no possible harm could arise, but we simply do not know. I raise this question solely because of the fact that we have recently had some correspondence concerning the possible carcinogenic effects of two of the coal tar colors which have been used for over 30 years in foods, which two colors are beta naphthylamine derivatives, but are not carcinogenic."

NOTE: The Office of the Rubber Director and the Food and Drug Administration are endeavoring to obtain the best information possible concerning the toxicity of general purpose synthetic rubber. This information is made available from time to time to aid rubber manufacturers in conducting their own experiments. Consequently, the entire responsibility for any use of this information in the manufacture of products for sale to the public rests solely with the rubber manufacturer.

Determination of Brittle Point of Rubber Materials in Cold Air

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THE increasing demand for rubber and rubber-like materials that can withstand low temperatures in service necessitates suitable methods for evaluating their properties at sub-zero temperatures. Several investigators have selected brittle point or the critical temperature of fracture as a criterion for evaluating the usefulness of a rubber material at low temperatures. Selker, Winspear, and Kemp[1] devised an immersion bath type of apparatus for determining the brittle point of rubber compositions upon freezing. Recommendations for modification in the design of the equipment were proposed by Morris, James, and Werkenthin[2]. Data obtained in both investigations indicate that there is a definite temperature at which the material under test will fracture when bent rapidly through 90°.

However, immersion bath tests have the disadvantage that the specimens are subject to extraction and/or swelling by the cooling liquid. Therefore, it appears desirable to develop a method for determining the brittle point of rubber materials in cold air. A method to determine resistance to cracking by flexing the specimens in cold air was developed by S. M. Martin[3]. However, the latter test is not entirely satisfactory, as the specimens are bent in a rather large loop instead of being subjected to a blow of definite impact combined with bending. Such a test may qualify a material for a lower temperature than it can withstand in some types of service. In order to simulate the severest type of service conditions, it is believed desirable to determine brittle point by subjecting the specimens to the combination of a blow of definite impact and bending through 90° in cold air.

Note: The opinions or assertions contained herein are the private ones of the writers and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

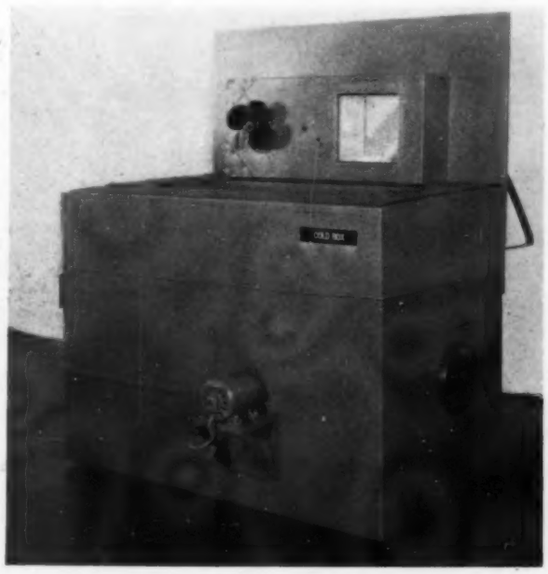

FIG. 1—Low Temperature Cabinet.

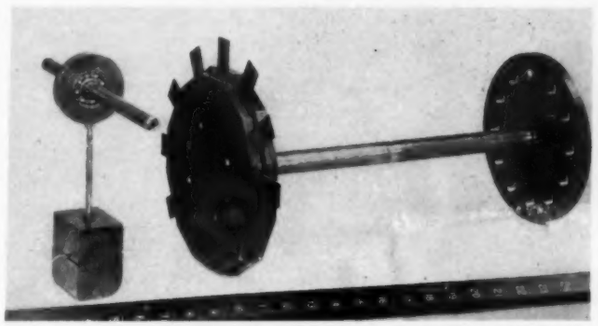

FIG. 2—Parts of Brittle Point Apparatus.

Additional papers recently presented at the Fall Meeting of the Rubber Division of the American Chemical Society[4, 5, 6] dealt further with the behavior of rubbers and synthetic rubbers at low temperatures. Liska[5] presented interesting data indicating that brittleness and stiffness are not necessarily correlated; thus, two samples may have essentially the same brittleness and one of them be so stiff as to be unsuitable for use, whereas the other sample may show a much lesser degree of stiffness.

One of the authors recently developed a method of measuring the force required to deflect which has been in use in several of the Navy laboratories for several months. The dyne tensiometer method[4] is a modification of this method. It is believed that in order to make a complete evaluation of the characteristics of the rubber or rubber-like materials at low temperatures it will be desirable to measure brittleness as well as stiffness.

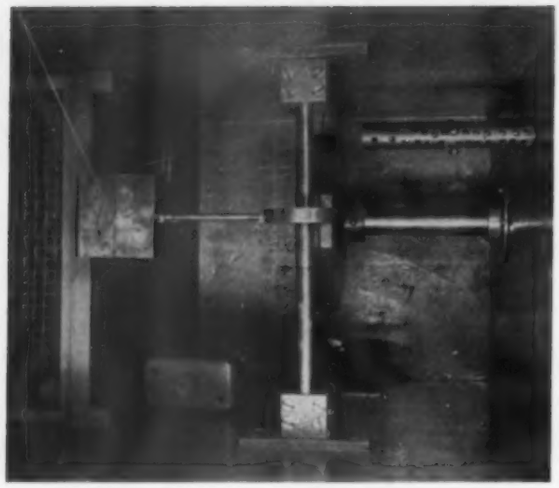

FIG. 3—Jig Mounted in Cold Box.

TABLE I

Stock Designation	Type of Rubber	Brittle Point, Degrees F. — Temperature Limit before Failure of Specimen (°F.)	Brittle Point, Degrees F. — Temperature at Failure (°F.)
E-174-24	Deresinated Guayule	—72, —72	—73, —73
E-197-5	Buton S.....	—62, —62	—63, —63
E-198-7	Butaprene NMX...	+ 7, + 6	+ 5, + 5
E-198-6	Butaprene NM.....	—30, —31, —31	—32, —32, —32
E-201-4	Butaprene NM.....	—58, —59	—60, —60
E-198-5	Butaprene NX.....	0, — 1, — 1	— 2, — 2, — 2
E-198-9	Chemigum I.....	—15, —15	—16, —16
E-201-5	Chemigum I.....	—53, —54, —54	—55, —55, —55
E-198-10	Chemigum X.....	+30, +29, +29	+28, +28, +28
E-201-2	Hycar OR-15.....	—32, —33, —33	—34, —34, —34
E-198-2	Hycar OR-25.....	—18, —19, —19	—20, —20, —20
E-198-4	German Perbunan..	—32, —33, —33	—34, —34, —34
E-198-3	Stanco Perbunan-26	—30, —31, —31	—32, —32, —32
E-201-3	Stanco Perbunan-26	—64, —65, —65	—66, —66, —66
E-201-1	Thiokol RD.....	—10, —12	—13, —13
E-198-18	Neoprene E.....	—32, —33, —33	—34, —34, —34
E-198-17	Neoprene FR.....	—48, —49, —49	—50, —50, —50
E-201-6	Neoprene FR.....	—68, —68	—69, —69
E-198-11	Neoprene GN.....	—32, —33, —33	—34, —34, —34
E-198-14	Thiokol F.....	—18, —19, —19	—20, —20, —20
E-198-16	Thiokol FA.....	—30, —31, —31	—32, —32, —32

Apparatus

The low temperature cabinet used in the tests is shown in Fig. 1. The cabinet has wood exterior and interior walls separated by 6 inches of glass wool batting. The lid contains a triple layer glass window 9 inches square for observation of the test, and a fan for circulation of cold air through the dry ice compartment and communicating working chamber. The working chamber is also provided with a fan for continuous circulation of air, and is illuminated by a 50-watt lamp.

A manually-controlled damper for regulating the amount of air passed over the dry ice is located in the partition between the two compartments. During the test, any selected low temperature down to —95°F. could be held within the limits of ± ½°F. by manual control, or ± 2°F. by means of a thermoregulator. Temperature in the working chamber was measured by means of a copper-constantan thermocouple and a potentiometer type pyrometer.

The essential parts of the brittle point apparatus are a specimen jig designed to accommodate 12 test specimens, and a pendulum hammer for striking the specimens. These parts are shown in Figure 2.

The specimen jig is secured to a shaft that is connected to a control plate mounted outside the cabinet. The specimens are clamped between an outer Bakelite and an inner steel plate, and are insulated from the steel plate by a single thickness of cardboard. The Bakelite plate is constructed so that the twelve flats on the periphery are 0.25 inch below the corresponding flats on the steel plate, thereby exposing one side of the specimen over a length 0.25 inch longer than on the other side. The maximum distance between flats is 8.2 and 8.7 inches for the Bakelite and the steel plates, respectively. The control plate is stamped with numbers to correspond with the position of specimens secured in the jig. The specimen to be tested is brought into position by revolving the shaft. A pin lug fitting into the control plate secures the shaft in the selected position.

A pendulum hammer made of steel is supported by a shaft mounted directly above the specimen jig. In order to assure free swing of the hammer it is attached to the shaft through a collar containing a dry ball bearing. The hammer is 3 inches long, 3 inches high and 2 inches wide, and has a leading edge rounded to a radius of 1 inch. The radius of swing of the hammer is 8.5 inches, and there is a clearance adjusted to 0.25 inch between the lower surface of the hammer and the flats on the steel plate of the specimen jig. A cord attached to the hammer and passing through a hole in the lid of the cabinet, is the means by which the hammer is raised to level position for striking the specimen.

Method of Test

Specimens 1 x 2.5 inches were died from test sheets 0.080 ± 0.005 inch thick. All specimens were buffed on both sides as it was found in preliminary tests that unbuffed specimens did not always break off clean at the critical temperature of fracture. A total of twelve specimens, consisting of two specimens each of six different materials, were arranged radially between the

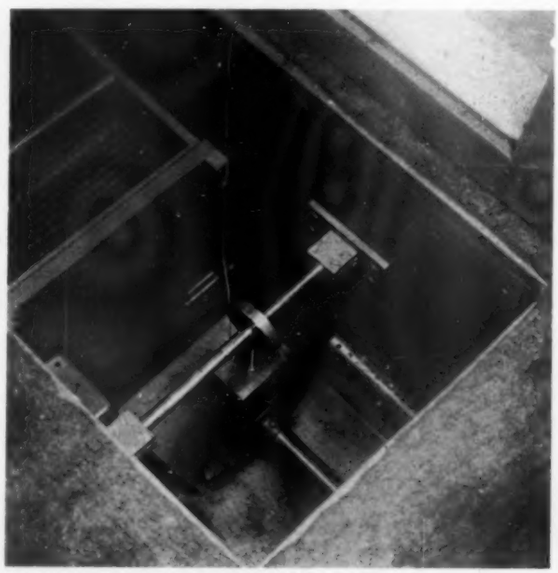

FIG. 4—Position at Instant of Impact.

TABLE II

	E-174-24 (Deresinated Guayule)	E-197-5 (Buton S)	E-198-7 (Butaprene NMX)	E-198-6 (Butaprene NM)	E-201-4 (Butaprene NM)	E-198-5 (Butaprene NX)	E-198-9 (Chemigum I)	E-201-5 (Chemigum I)	E-198-10 (Chemigum X)	E-201-2 (Hycar OR-15)	E-198-2 (Hycar OR-25)	E-198-4 (German Perbunan)	E-198-3 (Stanco Perbunan-26)	E-201-3 (Stanco Perbunan-26)	E-201-1 (Thiokol RD)	E-198-18 (Neoprene E)	E-198-17 (Neoprene FR)	E-201-6 (Neoprene FR)	E-198-11 (Neoprene GN)	E-198-14 (Thiokol F)	E-198-16 (Thiokol FA)
Deresinated Guayule	100.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Buton S	—	100.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Butaprene NMX	—	—	100.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Butaprene NM	—	—	—	100.0	100.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Butaprene NX	—	—	—	—	—	100.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Chemigum I	—	—	—	—	—	—	100.0	100.0	—	—	—	—	—	—	—	—	—	—	—	—	—
Chemigum X	—	—	—	—	—	—	—	—	100.0	—	—	—	—	—	—	—	—	—	—	—	—
Hycar OR-15	—	—	—	—	—	—	—	—	—	100.0	—	—	—	—	—	—	—	—	—	—	—
Hycar OR-25	—	—	—	—	—	—	—	—	—	—	100.0	—	—	—	—	—	—	—	—	—	—
German Perbunan	—	—	—	—	—	—	—	—	—	—	—	100.0	—	—	—	—	—	—	—	—	—
Stanco Perbunan-26	—	—	—	—	—	—	—	—	—	—	—	—	100.0	100.0	—	—	—	—	—	—	—
Thiokol RD	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100.0	—	—	—	—	—	—
Neoprene E	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100.0	—	—	—	—	—
Neoprene FR	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100.0	100.0	—	—	—
Neoprene GN	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100.0	—	—
Thiokol F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100.0	—
Thiokol FA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100.0
Pelletex (Carbon Black)	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Zinc Oxide	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	—	—	5.0	10.0	10.0
Stearic Acid	2.0	—	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0	0.5	0.5	0.5
Neozone A (Phenyl Alpha Napthylamine)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	—	—
Altax (Dibenzothiazyl Disulfide)	0.8	—	—	—	1.75	1.75	—	1.75	—	1.75	—	1.75	—	1.75	1.75	—	—	—	—	0.35	0.30
Benzothiazyl Disulfide	—	—	1.75	1.75	—	—	1.75	—	1.75	—	1.75	—	1.75	—	—	—	—	—	—	—	—
Dibutyl Sebacate	—	—	—	—	10.0	—	—	10.0	—	10.0	—	—	—	10.0	10.0	—	—	10.0	—	—	—
Dibutyl Phthalate	—	—	—	—	10.0	—	—	10.0	—	10.0	—	—	—	10.0	10.0	—	—	10.0	—	—	—
Di-Isobutyl Adipate	—	—	—	—	10.0	—	—	10.0	—	10.0	—	—	—	10.0	10.0	—	—	10.0	—	—	—
Litharge	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10.0	10.0	—	—	—
XLC Magnesia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10.0	—	—	4.0	—	—
FF Wood Rosin	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.0	—	—	—	—	—
Diphenyl Guanidine	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.10	0.10
Zinc Dimethyl Dithio-Carbamate	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tetramethyl Thiuram Monosulfide	—	0.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Micronized Sulfur	—	—	—	—	1.75	—	—	1.75	—	1.75	—	—	—	1.75	1.75	—	—	—	—	—	—
Sulfur	2.5	2.0	1.75	1.75	—	1.75	1.75	—	1.75	—	1.75	1.75	1.75	—	—	1.0	1.0	1.0	—	—	—

plates of the jig and clamped in position so that each specimen projected 1.25 inch beyond the flat surface of the steel plate. The jig was mounted in the cold box as shown in Figure 3. The approximate brittle point of each material was determined by subjecting the specimens to one or two blows of the pendulum hammer at temperatures decreased from room temperature in steps of 5°F. However, the specimens were conditioned for 10 minutes at each temperature prior to testing.

In order to determine the brittle point of each material more exactly, the tests were repeated in steps of 1°F. decrease in temperature in the brittleness range of the material. The highest temperature at which the specimen broke after being conditioned for 10 minutes at that temperature was taken as the brittle point of the material. The apparatus prior to, and at, the instant of impact of the pendulum hammer is shown in Figures 3 and 4, respectively.

Materials Tested and Results

Stocks prepared from the following rubbers were tested:

Natural: deresinated Guayule
Buna S type: Buton S
Buna N type: Butaprene NMX, Butaprene NM, Butaprene NX, Chemigum I, Chemigum X, Hycar OR-15, Hycar OR-25, German Perbunan, Stanco Perbunan, Thiokol RD.
Chloroprene type: Neoprene E, Neoprene FR, Neoprene GN
Organic polysulfides: Thiokol F, Thiokol FA

The detail formulations are given in Table II.

The results are given in Table I. In most cases the check tests were made on separate days.

Conclusion

The method described herein for determining brittle point is relatively simple, and the results are indicative of the ability of the material to withstand impact combined with bending. It is believed that this combination will more correctly evaluate brittle point than a bent loop test or other moderate flexing tests. If the material is exposed to low ambient air temperatures in service, then tests to determine brittle point should be made in cold air and not in an immersion bath. Appreciable differences in brittle point are obtained by tridicious modifications in compounding ingredients of Buna N and chloroprene type synthetic rubbers.

ACKNOWLEDGMENT

The authors wish to thank H. Nestlen for his advice and O. Retkoff who performed a large part of the testing. The authors are also indebted to Ross E. Morris, of the Rubber Laboratory, Navy Yard, Mare Island, California, who furnished the rubber stocks.

(See following page for references)

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Properties of Polymel Plasticizers and Extenders

POLYMEL is the generic name applied to a series of dry solid, easily handled compounds developed by the Polymel Corporation, Baltimore, Maryland, primarily as plasticizers and extenders for GR-S (Buna S). Four types of Polymel are currently available, each having the same general properties but special properties for specific applications.

Polymel A is a general purpose plasticizer and extender; Polymel B is a special purpose plasticizer and extender where high reinforcing in pure gum or compounded stock is required; Polymel C is designed for use in the oil-resistant synthetics, such as Hycar OR and Perbunan; Polymel D is a general purpose type especially useful in electrical applications and where improved flow is required.

The Polymel resins are not pure chemical compounds but composite resins resembling solid emulsions. All types, according to the manufacturer, combine readily with the synthetics on the mill or in the Banbury to give improved physicals. They are supplied in a physical form convenient to use, and may be accurately weighed and quickly handled. They are uniform throughout and do not change on standing. Melting points and specific gravities vary with type, as follows:

	M.P.	*Sp. Gr.*
Polymel A	135° F.	1.06
Polymel B	139° F.	1.13
Polymel C	138° F.	1.175
Polymel D	162° F.	1.021

In general, the Polymels are reported to have good processing characteristics, to furnish good physicals, low shrinkage, good tack and good extrusion values. Some of them may be used to advantage with reclaimed rubber. In running these resins on the mill or in the Banbury the usual order of incorporation of materials is suggested, and it is generally best to add Polymel immediately to the rubber. The accompanying table gives a brief view of the characteristics of the four types of Polymel currently available.

PROPERTIES OF POLYMEL COMPOUNDS

	A	B	C	D*	E	F	G	H
GR-S	100.	100.	100.	—	100.	100.	120.	100.
Hycar OR	—	—	—	100.	—	—	—	—
Polymel A	20.	—	—	—	—	—	—	—
Polymel B	—	20.	40.	—	—	—	—	—
Polymel C	—	—	—	20.	—	—	—	—
Polymel D	—	—	—	—	20.	—	—	—
Carbon Black	40.	40.	—	40.	40.	40.	40.	40.
Zinc Oxide	5.	6.675	6.675	5.	5.	5.	6.	5.
Sulfur	2.	2.665	2.665	2.	2.	2.	2.4	2.
Santocure	1.5	2.	2.	—	1.5	1.5	1.8	1.5
Santoflex B	2.	—	—	1.	2.	2.	2.4	2.
Altax	—	—	—	2.	—	—	—	—
Paraflux	—	—	—	—	—	10.	—	—
Stearic Acid	—	—	—	2.	—	—	—	—
Cure @ 52 lbs.	Tensile—p.s.i.							
30 Min.	2120	2460	1000	2875	1940	1863	2060	2410
45 Min.	2460	2580	870	3620	2455	1775	1510	2140
60 Min.	2600	2800	1120	3850	2900	1700	1540	1950
	After Aging 24 hrs. @ 100° C.							
30 Min.	—	—	—	—	2780	—	—	1890
45 Min.	—	—	—	—	2820	—	—	1680
60 Min.	—	—	—	—	2900	—	—	1950
	Elongation—%							
30 Min.	890	840	840	680	1000	660	460	500
45 Min.	740	780	780	640	800	580	380	440
60 Min.	700	700	860	640	780	560	360	380
	After Aging 24 hrs. @ 100° C.							
30 Min.	—	—	—	—	740	—	—	260
45 Min.	—	—	—	—	650	—	—	240
60 Min.	—	—	—	—	640	—	—	280
	Shore Hardness							
30 Min.	59–54	65–60	49–44	76–72	59–55	54–52	57–55	59–57
45 Min.	60–55	67–63	50–48	77–74	61–58	55–53	60–58	60–58
60 Min.	62–60	69–67	50–48	77–74	65–62	55–54	61–60	61–59
	After Aging 24 hrs. @ 100° C.							
30 Min.	—	—	—	—	69–66	—	—	70–68
45 Min.	—	—	—	—	69–66	—	—	70–69
60 Min.	—	—	—	—	70–68	—	—	70–69

* Cured @ 40 lbs. pressure.

Improved equipment for the cooling of compressed air results in drier air and prevents water damage to pneumatic equipment, according to the Niagara Blower Co., 6 East 45th St., New York City. The new **Niagara Aero After Cooler** for compressed air uses the evaporative cooling principle to obtain the lower temperature and a new design is said to give greatly increased capacity in compact apparatus.

American Instrument Co., Silver Spring, Maryland, is now offering **welded pressure vessels** as a standardized line of units for certain types of high-pressure use, particularly in research and pilot plant work. The vessels were designed especially for the storage of compressed gases at pressures up to 6,000 lbs. per sq. in.

A new type of **automatically engaging and self-disengaging centrifugal clutch** has been announced by the Amalgamated Engineering & Research Corp., 100 West Monroe St., Chicago 3, Ill. The new clutch can serve either as a coupling between shafts or as a driving pulley or gear in a transmission, as well as a starting cushion between power units and driven mechanism. It is known as the "Torkontrol."

Perbunan-Buna S Blends

By F. P. BALDWIN and R. M. HOWLETT

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Elizabeth, New Jersey

IN commercial compounds made from present emulsion type Perbunan* polymers it is customary to include some softener *(1, 2)* to facilitate factory processing and to impart certain desirable properties to the cured stock. Most commercially available softeners are sometimes partially extracted by petroleum products that contact the part in service. This condition may result in shrinkage if the polymer does not swell sufficiently to make up for the loss in volume due to plasticizer extraction. Such a loss in volume is undesirable if the stock is to be used for a gasket, seal or similar application.

If the immersion medium does not swell the Perbunan enough to compensate for plasticizer extraction, the shrinkage may be overcome by adding to the compound a material which will swell more than does Perbunan. For this reason mixtures of Buna S and Perbunan have been investigated.

Emulsion polymers of the Buna S type are not oil-resistant materials. Thus the addition of Buna S to Perbunan produces a blend which has decreased resistance to swelling by petroleum products. Buna S has better freeze resistance than Perbunan and it would normally be expected that blends of these two polymers would have freeze characteristics at least equal to and probably better than Perbunan itself.

* Trade Mark. Inquiries concerning the use of this material should be directed to Stanco Distributors, Inc., 26 Broadway, New York City.

TABLE I—PHYSICAL PROPERTIES OF BUNA S

Mooney Viscosity* (unmasticated) at 212°F. 1½ minutes, 4 minutes	65	61
Cured 45'/287°F.		
Tensile (lbs./sq. in.), Elongation (%)	2800	530
Modulus 300% (lbs./sq. in.), Shore Hardness ..	1150	67

Recipe: Polymer 100, Zinc Oxide 5, Stearic Acid 2, Benzothiazyl Sulfonamide 1, Sulfur 2, Medium Processing Channel Black 50.

* Large rotor.

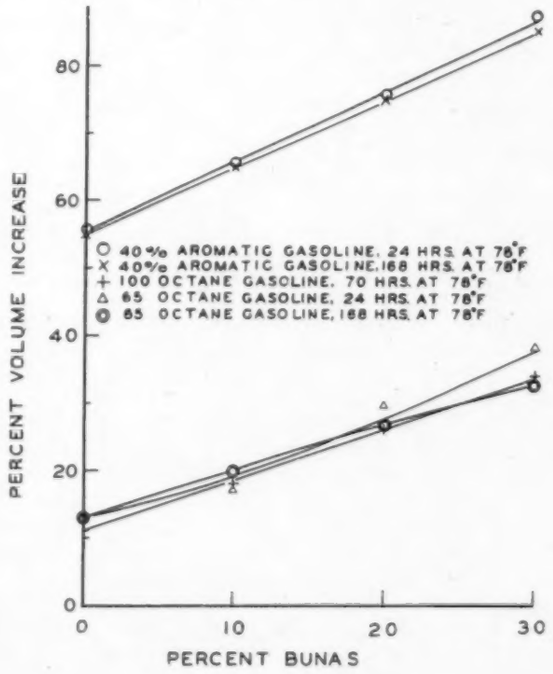

FIG. I.

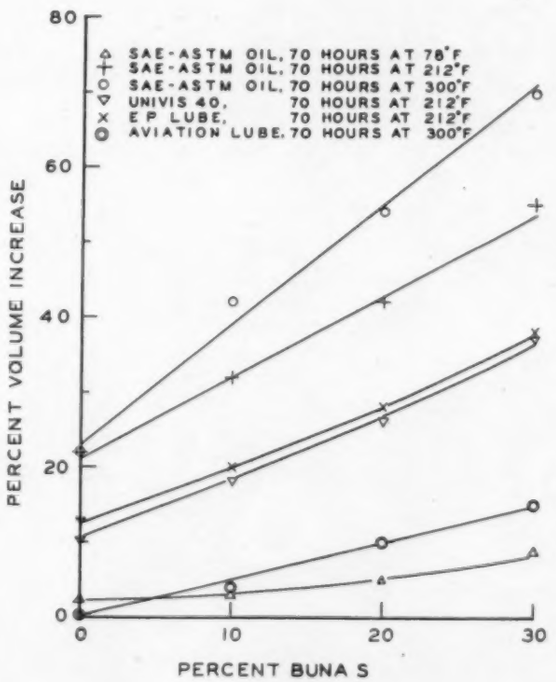

FIG. II.

TABLE II—PERBUNAN-BUNA S MIXTURES

Base Recipe: Polymer 100, Zinc Oxide 5, Stearic Acid 1.5, Semi-reinforcing Furnace Black 75, Benzothiazyl disulfide 1, Sulfur 1.5.

Cure 60′/287°F.

(a) O Buna S (b) 10 Buna S (c) 20 Buna S (d) 30 Buna S

Test Conditions	*Tensile*	*Elong.*	*Shore Hardness*	*Change Points Shore*	*Change % Tensile*	*Change % Elong.*
	Original Physical Properties					
(a)	2630	390	68			
(b)	2480	320	69			
(c)	2620	340	70			
(d)	2430	380	69			
After 24 Hours in 40% Aromatic Gasoline @ 78°F.						
(a)	1320	170		—13	—50	—56
(b)	1210	150		—14	—51	—50
(c)	1230	140		—16	—53	—59
(d)	990	130		—16	—59	—66
After 168 Hours in 40% Aromatic Gasoline @ 78°F.						
(a)	1520	190		—14	—42	—51
(b)	1330	160		—15	—46	—50
(c)	1250	130		—17	—52	—62
(d)	1160	140		—14	—52	—63
After 24 Hours in 65 Octane Gasoline @ 78°F.						
(a)	2260	300		0	—14	—23
(b)	1860	250		0	—25	—22
(c)	1790	220		—3	—32	—35
(d)	1700	220		—5	—30	—42
After 168 Hours in 65 Octane Gasoline @ 78°F.						
(a)	2040	260		—9	—22	—33
(b)	1880	220		—10	—24	—31
(c)	1790	190		—16	—32	—44
(d)	1610	200		—17	—34	—47
After 70 Hours in Esso Aviation 100 Octane Gasoline @ 78°F.						
(a)	2300	310		—3	—13	—21
(b)	2140	260		—4	—14	—19
(c)	1990	240		—8	—24	—29
(d)	1880	250		—9	—23	—34
After 70 Hours in Univis 40 Hydraulic Oil @ 212°F.						
(a)	2690	290		—3	+2	—26
(b)	2150	240		—6	—13	—25
(c)	2020	230		—10	—23	—32
(d)	1680	210		—13	—31	—45
After 70 Hours in Esso Aviation 100 Oil @ 300°F.						
(a)	2950	220		+2	+12	—44
(b)	2160	160		+1	—13	—50
(c)	2600	200		0	—1	—41
(d)	1490	140		—4	—39	—63
After 70 Hours in SAE-ASTM Rubber Process Oil @ 78°F.						
(a)	2570	350		+1	—2	—10
(b)	2460	330		0	—1	+3
(c)	2440	310		0	—7	—9
(d)	2320	320		—2	—5	—16
After 70 Hours in SAE-ASTM Rubber Process Oil @ 212°F.						
(a)	2120	290		—3	—20	—25
(b)	2050	280		—7	—18	—12
(c)	1700	223		—12	—35	—35
(d)	1460	210		—14	—40	—45
After 70 Hours in SAE-ASTM Rubber Process Oil @ 300°F.						
(a)	450	115		—8	—83	—70
(b)	400	110		—20	—84	—66
(c)	400	120		—23	—85	—65
(d)	340	130		—27	—86	—66
After 70 Hours in Extreme Pressure Lubricant at 212°F.						
(a)	2270	295		—11	—14	—25
(b)	2260	255		—11	—9	—20
(c)	1820	250		—15	—31	—26
(d)	1570	200		—19	—35	—47

TABLE II—CONT'D.

Test Conditions	*Tensile*	*Elong.*	*Change Points Shore*	*Change % Tensile*	*Change % Elong.*
After 70 Hours in Air Oven @ 212°F.					
(a)	2810	230	+11	+7	—41
(b)	2670	220	+9	+8	—31
(c)	2710	210	+12	+3	—38
(d)	2610	220	+12	+7	—42

Percent Extract

	Soxhlet Method (1) 40 Hours Extraction with CH_3OH	Soxhlet Method (2) 80 Hours Extraction with C_6H_6	(1) + (2) Total Extract	AMS Method
(a)	6.	2.2	8.2	.9
(b)	5.4	2.4	7.8	1.3
(c)	5.6	2.3	7.9	1.7
(d)	6.1	2.5	8.6	2.0

SAE-ASTM Freeze Test—5 Hours in Cold Air*

°F	—40	—50	—60	—70
(a)	OK	OK	B	B
(b)	OK	OK	OK	*OK*
(c)	OK	OK	OK	OK
(d)	OK	OK	OK	OK

Compression Set, ASTM D-395-40T, Method B 70 hrs. @ 212° F.

	% Con. Def.	*% Comp. Set*
(a)	30	56
(b)	30	57
(c)	30	57
(d)	30	56

* OK, no breaks; B, indicates break; *OK*, at critical point as shown by fact that an occasional sample will break at this temperature.

Buna S is a somewhat slower curing material than Perbunan. However, the difference is not great, and since the molecular structure of both polymers is quite similar it may be presumed that the two polymers would co-vulcanize satisfactorily.

Experimental

In this work the following base compound was used:

Polymer	100.0
Zinc Oxide	5.0
Stearic Acid	1.5
Semi-reinforcing Furnace Black	75.0
Benzothiazyl Disulfide	1.0
Sulfur	1.5

In this recipe 10, 20, and 30 parts of Perbunan were replaced by an equivalent amount of Buna S and the properties of the blends determined. Tensile slabs were press cured 60′/287°F. and the compression set blocks and abrasion block (Grasselli) on which hardness determinations were made were cured 70′/287° F. to allow for the increased thickness.

The Buna S used in this work was manufactured by the Standard Oil Company of Louisiana. The properties of this polymer may differ in some respects from those of the present GR-S. In applying this work it appears to be advisable for the compounder to use GR-S in the particular stock in which he is interested. In this way he will be working with the material which he will use in the factory, and thus the factor of any differences in the properties of the butadiene-styrene

polymer will be eliminated. Evaluation data for the Buna S used in this study are contained in Table I.

This work was planned to show the effect of substitution of Buna S on the original physical properties, volume increase and deterioration of physical properties in various petroleum products, oven aging, compression set, freeze resistance and extract of the stocks. In most cases these compounds have been evaluated under conditions set forth in the Aeronautical Materials Specifications. The specifications for the fluids and methods of test used in this study are presented in Table III.

Extraction Data

Extraction data were obtained by a method designed to indicate whether the Buna S in the blend vulcanized. The stocks were first extracted in a Soxhlet with methyl alcohol and the amount of extract determined. The methyl alcohol removes the stabilizer, fatty acid and emulsifiers from the polymer. This was done to remove these products so they would not mask the results of the subsequent benzene extraction. The methyl alcohol was then replaced by benzene, and the benzene extract was obtained.

In addition, extracts were found by the type of test used by industry to determine extracts on synthetic rubber products. The particular test used was the one outlined in the Aeronautical Materials Specifications, and, presumably designed to approximate service conditions. It is not as severe as the test involving the methyl alcohol and the benzene extractions.

Results

The tensile, elongation, hardness, air oven aging and compression set data which are contained in Table II indicate that the addition of Buna S to Perbunan does not alter these properties. Data in this table indicate that for the methyl alcohol and benzene extractions the amount of the extract is similar. Extract values which were obtained by the Aeronautical Materials Specification method also indicate that the extracts are of a magnitude which will not present difficulties in meeting the existing specification limits. When all these factors are considered it is apparent that both polymers have vulcanized.

The volume change in the various immersion media are plotted in Figures 1 and 2. Within the limits of test accuracy and wherever immersion times are long enough to establish equilibrium, these results show the volume increase to be approximately a linear function of the Buna S present. The data show how swell may be varied through rather wide limits by the addition of Buna S to Perbunan. The effect of softeners on the swell of Perbunan-Buna S blends has been shown in another study *(3)*.

Increasing the amount of Buna S produces an increase in the percent change in physical properties after aging. The trend is not as regular as the one shown for the effect of Buna S on volume increase. In any case the increase in swell produced by the addition of Buna S to Perbunan creates a decrease in tensile after immersion.

Freeze tests (Thiokol Bend) show the presence of Buna S in a Perbunan compound to be beneficial. This improvement is dependent on the amount of Buna S present.

TABLE III—SPECIFICATIONS FOR FLUIDS

Fluid	*Specifications*
Esso Aviation 100 Octane Gasoline	AN-VV-F-781, Grade 100
65 Octane Gasoline	AN-VV-F-756, Grade 65
Univis 40 Hydraulic Oil	AN-VV-O-366 (1)
Esso Aviation 100 Oil	AN-VV-O-446, Grade 1100A (2)
SAE-ASTM Rubber Processing Oil	Aniline Point 159 ± 3 °F. (3) Viscosity 155 ± 5 S.S.U. at 100°
Extreme Pressure Lubricant	ACY 3587 (4)
40% Aromatic Gasoline	60% Esso Aviation 100 Octane Gasoline, 5 Benzene, 20 Toluene, 15 Xylene

Notes: (1) Aniline point 190° F. (2) Aniline point 256° F. (3) Aniline point 156° F., Viscosity 150 S.S.U. at 100° F. (4) Aniline point 181° F., Viscosity 149 S.S.U. at 130° F.

Test Methods

Tensile Retention—ASTM D-471-43T, Immediate Deteriorated Properties, with tensile calculated on basis of original gauge.

Freeze Test—Described on page 279 of ASTM Standards on Rubber Products (February, 1943) under proposed SAE-ASTM Classifications and Test Requirements for Rubber Compounds. This is also known as the Thiokol Bend Test.

Extraction Methods

Soxhlet Method—Five gms. of finely ground cured sheet was extracted for 5 hours with methyl alcohol in a Soxhlet extractor. The methyl alcohol was evaporated and the amount of residue determined. The same sample was then similarly extracted with benzene for 80 hours, and the amount of extracted material determined. The sum of the two extracts equals the total extract.

AMS Method—Ten gms. sample diced into 1/16" cubes was placed in 250 ml. of 40% aromatic gasoline for 48 hours at 78°F. The gasoline was decanted from sample and evaporated to determine the amount of residue.

Conclusions

From observation of these data the following conclusions may be drawn:

1. The addition of Buna S to Perbunan does not affect the original physical properties of the compound.
2. Buna S can be used in Perbunan compounds to increase swell and/or eliminate shrinkage due to extraction of plasticizer. The volume increase after immersion is approximately a linear function of the amount of Buna S present. This is of particular interest in respect to petroleum products of high aniline point.
3. By virtue of the increased swell the addition of Buna S decreases the tensile retained after immersion.
4. The presence of Buna S improves the freeze resistance (as measured by the Thiokol Bend Test) of Perbunan compounds.

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(2) Stanco Distributors, Inc., "Perbunan, Compounding and Processing", 1943.
(3) *Ibid*, Tentative Supplement, Section V.

BACK THE ATTACK
BUY
WAR BONDS AND STAMPS

NUMBER **TEN** OF A SERIES OF ARTICLES ON

Better Management for the Rubber Factory

X—FIRE INSURANCE

By ARTHUR ROBERTS

TODAY, many rubber products manufacturers are over-insured or under-insured, increasing overhead at a time when expenses should be sharply curtailed and risking a financial loss through no coverage or inadequate protection in these days of priorities and building restrictions when it will be difficult to get back in working order again. If coverage is void through some oversight, the policyholder may experience a heavy financial loss plus business stoppage more costly than in normal times.

Fire Insurance Little Understood

Probably no other business necessity is so little understood and bought so haphazardly as fire insurance. The rubber products manufacturer buys a policy, then usually lays it away, feeling confident that he is adequately covered, and forgets it until renewal time. A fire occurs and only then may he realize that one or more legal requirements have not been fulfilled, the terms of the policy have been violated, and protection has been forfeited.

In doing research work on this subject, we contacted numerous policyholders who had unintentionally committed some act that "breached" a policy, rendering it void, believing that they were protected against certain losses, only to find, after paying excessive rates for years, that every advantage was available at lower rates, with or without certain adjustments obtainable at little expense. From an analysis of our survey work sheets covering this subject, we have compiled the following reasons why members of this industry are either paying too much for adequate protection or are inadequately protected; also suggestions for correcting these deficiencies.

1—*Under-Insurance:* Serious losses can be sustained by carrying too little insurance. In practically all cases investigated, failure to carry adequate insurance involved co-insurance, a term misunderstood by many. Fire insurance premiums are generally based upon the assumption that all policyholders will carry a certain percentage of insurance to value, usually 80 per cent. If a policyholder does not meet these requirements, he becomes a co-insurer: that is, he insures himself for the amount he is short. Because of the rate reduction, the insurance company fixes the amount of co-insurance that must be carried under the co-insurance clause and, regardless of the loss, if the insured does not carry insurance equal to this stipulated sum, he is co-insurer for the difference.

For example, one rubber products manufacturer carried $60,000 on a building worth $100,000, but should have carried $80,000, which is 80 per cent of value. A fire caused a $50,000 loss. The policyholder, insured for $60,000, expected to collect $50,000, but received $37,500 or ¾ of $50,000, because he had insured for only ¾ of $80,000, the necessary 80 per cent of actual property value. Had he carried $80,000 insurance on the $100,000 property, he would have collected $80,000 on an $80,000 loss. With full coverage under the 80 per cent co-insurance clause, only the last 20 per cent of a complete loss falls on the insured.

2—*Over-Insurance:* The purpose of fire insurance is to reimburse for a fire loss. The policy agrees to indemnify to an amount, not exceeding the actual value of the property at the time the loss occurs, limited to the sum specified in the policy. Because a property owner is in a better position to know the value of his property, the burden of procuring adequate insurance is placed upon him. He has nothing to gain by over-insurance.

Fixing the Amount of Protection

The amount of protection must be based upon the actual replacement value of the property at the time when the fire occurs. That does not mean that an old building should be insured for enough to build a brand new one like it, but it should be insured for enough to build a new structure, less the depreciation accumulated on the destroyed property; therefore, ascertain what the property is worth at the time the policy is written so that the protection carried approximates actual value. Policyholders could save thousands of dollars if they ascertained the "present value" of their properties from year to year or when renewing

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policies, because many are paying premiums on sums far in excess of present value; yet, that is all they can collect if the property is destroyed by fire.

Inventory restrictions and material shortages have cut the "carry" in stockrooms and warehouses, yet some policyholders are paying the same price for coverage that they did before the war, although the stock on hand is less. Then, too, finished products are shipped out as fast as produced. They do not accumulate in warehouses waiting for glutted markets to loosen up or customers to order at their convenience. Thus, there is less need for insurance protection and policies may be adjusted downward at a saving, unless the higher prices today make up the differential. After the war, if prices drop, check your inventory coverage to see if you can't reduce it accordingly.

3—Business and Fire Losses: A fire insurance policy doesn't indemnify for the business profits lost through fire, so consider "Use and Occupancy," or business interruption insurance, which may be acquired at reasonable additional expense, and which may be supplemental endorsement to an existing fire policy, protecting earnings lost through fire, a loss that may be greater today because you cannot rebuild so readily under wartime restrictions. This policy insures to the extent of the net profits earned, plus such fixed charges and expenses entering into the conduct of the business, as would continue during a suspension.

The loss is limited, in normal times, to the time required to rebuild the damaged property. During the war, however, the major companies have raised the rates on renewals because restrictions may increase the time required to get back into working order and unless you pay the increased rate there may be a time limit specified. Check this with your agent. The usual coverages are against fire, riot, explosion, tornado and civil commotion.

Additional Precautions to Watch

4—Fire Hazards: Keep down the fire hazard and you keep down insurance expense. The installation of preventive equipment, such as fire shutters and extinguishers, and the use of approved containers for inflammable liquids, the making of structural changes, will sometimes save real money. Look over your property for possible hazards, then talk to your insurance consultant about eliminating them.

5—Periodical Check-Over of Policies: Many policyholders scrutinize their policies only at renewal time, then often in cursory manner. In the meantime, many hazards may have developed to void a policy or burden the insured with an undesired risk. Repairs to a building often render a risk more hazardous than when the policy was written. Some policies limit alterations to a certain period; after that the building may not be covered. If you make extended repairs, it may be necessary to get permission to keep the policy in force. If inflammable liquids are put on the premises, make sure the policy covers them. If a building is partially frame and brick, see that this is clearly stipulated. See that changes in assets or ownership are noted and all holdings fully described. Every clause in an insurance policy means something, so read them and comply.

6—Pig-in-Poke Insurance Buying: Many buy insurance hit-or-miss, place a policy here or there to please a friend or lodge brother or buy on price. We have found cases where policyholders were paying twice for some insurance because they had bought it piecemeal from anyone, resulting in overlapping coverage between two policies, which means paying twice for the same thing. In other cases we have found too much insurance on stock, too little on the building, too much on equipment, etc. In such cases, policyholders are paying for enough insurance but it isn't in the right places and they have probably a 50/50 chance of collecting in full if a loss occurs.

Check Insurance Policies Regularly

Determine if your policies are eligible for supplemental endorsement, covering losses from tornado, hail, falling trees, explosion, riot, aircraft damage, etc., additional features available for a small additional sum eliminating the carrying of separate policies at greater expense. If you divide your insurance among several agents, see that all use the same form, then all policies on the same property will be on an equal basis, should it be necessary to adjust a loss.

A fire policy does not cover enemy action. You can buy War Risk insurance at low rates from an established company. Only plants in coastal cities or bomb target areas should find this coverage necessary.

Insure adequately, spreading out the cost to make it easier to pay than when this expense falls due at one time. Some rubber products manufacturers have their policies checked when books are audited, thus systematizing the check-over and eliminating the possibility of oversight.

Addenda and Errata
1943 RUBBER RED BOOK

Note: To help keep your copy of the 1943 RUBBER RED BOOK up-to-date this column will be published from time to time in the next few months. Additional current information can be transferred to the Directory from the regular news pages of RUBBER AGE.

Page

30 Constad Laboratories. Change address to 44 West 29th St., New York, N. Y.

35 Dorney Manufacturing Co. Change address to 5816 So. Lowe Ave., Chicago, Ill.

39 Federal Telephone & Radio Corp. Change address to 591 Broad St., Newark, N. J. Change name of "H. A. Warner" to A. J. Warner, and his title from "Chemist" to "Director of Research and Development, Intelin Division."

57 Lorica Laboratories, Inc. Delete. Moved, left no address. Also delete under "Drug Sundries" on p. 99 and under "Jersey City" on p. 151.

61 Erwin E. Miller. Change name to Fullerton Manufacturing Co., same address.

63 Molded Rubber Specialties Co. Change address to 511 Commercial St., Glendale, Calif.

85 Typrene Roller Co. Change address to 1504 East 4th St., Los Angeles, Calif.

364 Under "B" insert Bunatak Chemical Co., 227 Pleasant St., Malden, Mass.

369 Sharples Chemicals, Inc. Change address to 123 So. Broad St., Philadelphia, Penna.

454 Under "Akron" insert Continental Carbon Co. — Carl Minnig, Peoples Bank Bldg.

Editorials

Brazilian Rubber

THE new agreement recently negotiated between the United States and Brazil, under which Brazil will take over the complete procurement of rubber and the United States will pay a premium of 15c a pound over the previously-agreed upon price of 45c a pound, has been hailed by some critics as an admission that our rubber procurement policy in Latin America, accused of being outrageously extravagant, has bogged down, if not completely failed. A review of the facts belies this statement.

It will be recalled that when the rubber procurement program was first launched in Brazil and other Latin American republics, these republics were in no position to guarantee delivery of supplies needed to get rubber out of the jungle areas. They needed a great deal of help along these lines, furnished to them by the United States. Since the goals for rubber procurement were set high, way and above the maximum production ever achieved in Latin America, it was natural that special programs, featuring many innovations, were set in motion. Such programs resulted in a bureaucratic system, which has already been severly—and in many cases justly—criticized.

Ever since the Rubber Development Corporation was organized, with Douglas Allen at its head, that corporation has advocated a policy of private enterprise where possible. The new agreement between the United States and Brazil, forerunner of other similar agreements to be signed with other republics below the Rio Grande, is an expression of that policy, and definitely not an admission of failure on the part of the Rubber Development Corp., which took over all rubber procurement efforts from the Rubber Reserve Co. and the Bureau of Economic Warfare just about a year ago. Mr. Allen, himself, is known as a strong advocate of private enterprise.

As it now stands, in exchange for the premium price for rubber delivered in a specified period—February 9, 1944, to March 31, 1945—the Brazilian Government will put up a fund of approximately $500,000 to finance price stabilization and the work of developing new producing areas. It will continue its job of moving tappers into rubber growing areas and getting as much rubber out as possible. Some aid in these endeavors will continue to come from the Rubber Development Corp.

To date the amount of wild rubber secured from the Amazon—at an estimated cost of $1.12 a pound—has been disappointing. Whether annual amounts will be increased under the new system of private enterprise remains to be seen. Brazilian authorities are optimistic on the subject, talking in terms of 100,000-ton production, but time alone can tell.

Pleasure Driving

THE latest action of the OPA in its tire rationing program—switching eligibility from a "mileage" to an "occupational" basis—is truly indicative of the impending tire shortage which faces essential transportation in the coming months. The cut-back in the estimate of new tires to be made available for such purpose this year from the original 30,000,000 tires to between 18,000,000 and 24,000,000 tires serves to accentuate the difficult situation. In view of these circumstances, foreseen a long while back by tire authorities, we again urge upon the Rubber Director the necessity of eliminating pleasure driving for the duration—or until the tire situation eases up. We know how drastic such a step would be, but global warfare calls for drastic measures.

CURRENT NEWS OF THE MONTH

BASIC RUBBER REGULATIONS ARE REVISED; NEOPRENE A SPECIAL PURPOSE SYNTHETIC

IN THREE separate actions taken during the past several weeks, since the appearance of our last issue, the Office of the Rubber Director has published a complete revision of the basic rubber regulations (Rubber Order R-1 and Appendixes), placed the use of neoprene under quota restrictions, and tightened the regulations to further conserve the supply of various types of rubber cement, especially neoprene cement, for essential war purposes. These changes reflect the constant flux in the supply and demand of and for the synthetic rubbers, particularly military demand which is now considerably above earlier estimates for a wide range of rubber products. Additional changes in the over-all rubber regulations may be expected in the near future.

The revision of the basic rubber regulations was accomplished in the issuance of a new order which provides a unified compilation of all rubber directives and amendments issued heretofore. The new order is termed "Rubber Order R-1, as Amended January 12, 1944," and, as indicated by the date, was issued on January 12 by ORD. It includes a number of new provisions which reflect progress in the conversion from crude to synthetic rubber, among such provisions being the following:

List of New Provisions

Combat Tires: Conversion of combat tires from 30 per cent to as high as 95 per cent synthetic rubber is now provided. Combat tires are used on military equipment such as half-tracks, scout cars and gun mounts. The conversion of combat tires to synthetic rubber will not affect the larger sizes of combat tires, which are still to be manufactured from crude rubber.

Large Inner Tubes: A 20 per cent reduction in the crude rubber content of truck tubes of 10.00 cross-section (used for vehicles such as large trucks) has been provided. Formerly a maximum of approximately 80 per cent crude by volume was permitted. The maximum now permitted is approximately 64 per cent crude.

Rayon Tire Cord: Sufficient rayon tire cord is available to permit its use in city bus tires and in inter-city truck tires. Previously, such tires were required to be made of cotton cord.

Tire Patches and Reliners: Scrap tires (except light-colored carcass) may now be purchased for the manufacture of tire patches and reliners, through normal trade channels.

Rubber Gloves: The sale of rubber gloves to a consumer for household use can be made only upon presentation of a doctor's prescription.

Airplane Tires: One hundred per cent synthetic treads are now provided for all airplane tires, except beaching gear tires, fighter tires, and ice grip tires.

Small Bogie Wheel Tires: These tires, which are used on such military vehicles as light combat tanks, are now converted to 92 per cent synthetic rubber.

Cord Dip: Effective February 1, manufacturers are required to use a cord dip composed of about 50 per cent synthetic or reclaimed rubber.

Streetcar Sandwich Wheels: This equipment is used on streetcars to reduce vibration. It is to be made only from synthetic rubber after February 1.

Vibration Mounts and Dampers: This equipment is used to protect delicate equipment from shocks and vibrations. No crude rubber is to be used in the manufacture of compression-type mountings after March 1, except for certain special types in which synthetic rubber has not yet proved entirely satisfactory.

Long Range Field Wire: Only synthetic rubber is to be used in Type W-143 after February 1. This wire is used for telephonic communication and similar communication and similar purposes.

Milking Equipment and Equipment Used in the Handling of Milk: Use of crude rubber in the manufacture of such items is prohibited.

Proofing Compounds: This material is used in industry for providing fabrics and garments with a protective coating of rubber. Such compounds may now be made only from reclaimed rubber.

Elastic Webbing: This material is used in such items as men's garters. It may now be made only from reclaimed rubber.

Covering for Crab-Trap Frames: Permission is now given for fishermen to use synthetic inner tube scrap on crab-traps.

Curing-Vent Overflow on Airplane Tires: Manufacturers are now permitted to clip or shear this material from airplane tires. The operation of removing curing-vent overflow was previously prohibited by the Office of the Rubber Director in order to increase tire production. The regulation has now been relaxed at the request of the armed services in the case of airplane tires only.

Washing Machine Drain Hose: This type of hose was previously prohibited, but may now be made from low-grade reclaimed rubber.

Synthetic Tubes and Tubing: Additional provision has been made for the use of such equipment for medical, surgical, veterinary, and mortuary uses.

Scrap Rubber Transactions: Scrap rubber has been subject to the control of Rubber Reserve Corp. Since January 1, Rubber Reserve has no longer purchased scrap rubber, due to the fact that a sufficient stockpile of scrap was on hand. The basis of Rubber Reserve's control over scrap rubber has been a provision in the Rubber Order. The provision is now cancelled.

Destruction of Scrap Rubber: Restrictions on destroying scrap rubber have been removed, since the stockpile on hand is regarded as adequate.

Neoprene on Quota Basis

Increased demand for the use of neoprene in many essential war products caused the ORD to put that material under quota restrictions. This was done on February 1 by issuing an amendment to Appendix III of Rubber Order R-1. That amendment specified that "No person shall consume General Purpose Synthetic Neoprene types GR-M, GN or Latex without a quota assigned by quota directive or other authorization specifying the amounts which he may consume, and no person shall exceed the quantities which he is specifically authorized to consume in any designated period."

It was further explained by the ORD that the order establishing quotas for the use of neoprene will not prevent manufacturers from using it in civilian goods and that while still required to observe the restrictions contained in Rubber Order R-1, manufacturers who have neoprene left over after filling rated military orders will be allowed to employ the remaining neoprene for civilian requirements.

Officials also made it clear that the quota system was adopted to prevent further overloading of production facilities, at the same time emphasizing the fact that output of neoprene has been a fraction above anticipated production. In an effort to coordinate production and use, liberal quotas will be adopted which,

however, will be slightly less than scheduled output.

The amendment to Appendix 3 also gave shoe manufacturers until April 1, 1944, to make use of inventories of shoe cements containing crude rubber. The previous deadline was February 1, but it was extended because the crude rubber contained in such cements cannot be salvaged for more essential uses under the rubber conservation program.

The amendment also specified that after February 15 no person shall use any cement containing neoprene for the covering of wood heels except to fill government orders and contained a definition of light colored carcass scrap.

Regulations Further Tightened

The third action taken by ORD was to issue Amendment No. 1 to Rubber Order R-1, as Amended January 12, 1944. This amendment was issued on February 4 and contained several changes to the basic rubber regulations, all with the object of conserving the supply of various types of rubber cement, especially neoprene cement, for essential war purposes.

Whereas synthetic rubber cements could formerly be used for the manufacture of any product unless expressly prohibited, the new amendment reverses the situation in that the use of such cements are now banned unless expressly permitted in the rubber regulations. This applies particularly in the case of neoprene cements. Synthetic rubber cement, however, is still permitted for shoe manufacturing operations, except for neoprene cement which may now be used for shoe manufacturing only in specific operations, including folding, toe and side lasting, sole attaching, and insole reinforcement by all methods.

Use of any kind of rubber cement is now prohibited in paper products, the only exception being in the case of paper products used in the manufacture of shoes. Previously, rubber cement made from either synthetics or reclaimed rubber was permitted for a number of paper products. The new regulation has the effect of adding such products as greeting cards and graphic-art layouts to the prohibited list, which already includes upholstery, backings for rugs, and many other civilian items.

The new regulations include a special provision permitting manufacturers to paint tires and tubes, and also to clip or shear curing-vent overflow. The latter material is produced in the course of manufacturing, when tires are formed in molds under great heat and pressure. Overflow appears on the finished product as rough irregular tatters of extruded rubber. The previous prohibitions against painting tires or removing vent overflow were applied in order to conserve manpower and speed up tire production. The prohibitions have been revoked in order to conform with current recommendations made by the rubber industry and by the Army and Navy procurement services.

In a brief explanation of the tight neoprene situation, ORD officials stated that based upon requests as estimated last year for the use of this material it was thought that there would be reasonable quantities for elastic yarn and thread, as well as some other civilian items, by the spring of this year. Plans had to be changed, however, to meet the demands resulting from the production of invasion weapons which obviously have first call on neoprene. Some manufacturers, it was believed, will use Buna S for the production of rubber thread and similar items.

Although previously neoprene was one of the types of synthetic rubber permitted for use as a general purpose synthetic, within the limitations of the rubber regulations, it will be handled as a special purpose synthetic for the next few months. Allocations, it was explained, will be made by end-product use.

SYNTHETIC RUBBER PRODUCTION PASSES 50,000 TON MONTHLY MARK

The production of synthetic rubber has passed the 50,000 ton monthly mark, according to a statement attributed to Rubber Director Bradley Dewey on February 9, and is now running at an annual rate of approximately 600,000 tons. A monthly production of 75,000 tons is seen by mid-year, or 900,000 tons annually. Actual production in the fourth quarter of 1943 was officially announced at 124,219 long tons, of which 105,711 was Buna S. This exceeded advance estimates by almost 1,000 tons.

Production facilities are still being rushed to completion to meet the total planned capacity. In this connection it is interesting to note that on January 21 Goodyear announced full completion of its part of the program. Total facilities completed by Goodyear for the government have an annual rated capacity of 150,000 tons and represent an investment of approximately $28,900,000. They are operated for the Rubber Reserve Corp. by the Goodyear Synthetic Rubber Corp., a subsidiary established by the Akron concern for that specific purpose.

The Goodyear-operated plants include a 30,000-ton plant at Akron, a 60,000-ton plant at Houston, and another 60,000-ton plant at Los Angeles. The latter is part of a 90,000-ton installation, the remainder being operated by U. S. Rubber. These are in addition to the company-owned plant operated by Goodyear at Akron.

Alcohol Major Ingredient

According to Rubber Director Dewey, approximately 53% of the 1944 butadiene output required for the synthetic rubber program will be made from alcohol bases. This is primarily due to two factors: (1) late completion of petroleum facilities, and (2) low production capacity of the petroleum process plants. Col. Dewey, however, emphasized the point that the amount of butadiene produced from petroleum will eventually surpass current alcohol production records.

Production of butadiene from petroleum bases will be stepped up as soon as all of the crude oil units have been completed and the terrific demand occasioned by invasion preparation and the constant heavy bombing of Germany for high-octane gasoline begins to level off. In addition to the lag of completed facilities, there is also a definite shortage of butylenes. Accordingly, petroleum-butadiene plants can operate at rated capacity but no more, whereas the alcohol-butadiene plants are reported to be exceeding rated capacity by as much as 150%.

Petroleum authorities point out that it was expedient to provide as much butadiene as possible in as short a time as possible and therefore higher rating priorities were given to alcohol-butadiene facilities. They insist, however, that there are no major "bugs" in the petroleum cracking processes and that sooner or later butadiene from petroleum sources will far outstrip that from alcohol. It was further stressed that the purity of the butadiene from either petroleum or alcohol bases was identical.

In the meantime it was learned that an additional $1,000,000 has been made available by the government to the Sun Oil Co. for further butadiene facilities at its Toledo, Ohio, plant. This plant is using the Houdry Process, and now represents an appropriation of $7,300,000. In some quarters it is stated that the Houdry Process, which worked so well in laboratory tests and pilot plant production, has run into several difficulties in commercial practice. The process is also in use at the El Segundo, Calif., plant of Standard Oil of California.

Tire Estimates Reduced

Originally, it was officially estimated that increased synthetic rubber production would permit the manufacture of 30,000,000 tires for essential civilian use this year. An expansion program to meet this demand was started by the tire manufacturing industry several months ago, although many a tire official cast doubt on the ability of the industry to meet that goal.

Twice within recent weeks Rubber Director Dewey has changed his original estimate. In mid-January he indicated that he would be satisfied if the industry produced 80% of the estimate, or 24,000,000 passenger car tires. On February 9 he intimated that the program was likely to produce only between 18,000,000 and 24,000,000 tires.

According to Col. Dewey, an unexpectedly heavy demand from the military for tires has thrown earlier calculations out of balance, the latter having

been "chewing up" tires at a much faster rate than was expected, thereby putting a strain upon the synthetic rubber, tire cord and fabricating portions of the tire production program. Production of heavy tires, he said, will be limited for some time to come by available tire manufacturing facilities as well as rayon cord.

On February 8, WPB advised producers of high tenacity rayon yarns used in the manufacture of tires, that they may exclude from their total spindles on which export percentages are based those spindles used in the production of such yarns. Prior to this action, all producers were assessed 4% of their total production of yarns for export purposes.

Earlier, U. S. Rubber announced the complete conversion of its mills at Shelbyville, Tenn., and New Bedford, Mass., from duck to automobile tire cord. It was also learned that the Aldora Mills operated by General Tire at Barnesville, Georgia, has started a construction program designed to increase the mill's capacity by 60%. Output was recently increased 40% by expanded facilities.

All war production schedules of the Goodyear plant at Jackson, Mich., have either been completed or transferred to other plants, and that plant is now completely reconverted to the manufacture of tires. Present schedules call for the plant to reach capacity production by the end of this year, production at present being about one-third of capacity. Production prior to conversion to the manufacture of cannon and other war materials amounted to more than 9,000 tires daily.

PRICE REPORTING EASED ON MANY PRODUCTS; OTHER NEW REGULATIONS

Manufacturers of certain rubber commodities purchased for government use need no longer file maximum price reports in connection with experimental production and small orders. This action was taken by OPA in issuing Amendment No. 7 to M.P.R. 403 (Certain Rubber Commodities Purchased for Governmental Use), and became effective February 5.

Commodities referred to include a long list of such varied items as wearing apparel, lifebuoys and parachute parts and equipment, made in whole or in part of rubber and bought for government use. The amendment requires manufacturers affected by the regulation to make reports of maximum prices only when orders have been received for more than one unit and total sales reach $1,000.

A clarification also specifies that covers, such as engine covers, not mentioned in the original regulation, are subject to its provisions, as are tarpaulins.

While the volume of reports is now reduced, there is no change in the forms used or in the manner of their filing. Procedure for correction of maximum prices which have not been properly computed and for adjustment of those not in line with the level of maximum prices established by the regulation also remains unchanged.

DRUG SUNDRIES

Applications for adjustment in ceiling prices can be filed by essential producers of certain essential rubber drug sundries who can meet specified conditions according to the terms of Amendment No. 14 to M.P.R. 300 (Maximum Manufacturers' Prices for Rubber Drug Sundries). The amendment, issued on January 13, became effective January 19.

Applications can be made only by a producer whose output cannot reasonably be expected to be replaced at a price lower than the proposed adjusted ceiling, or one who has entered into or proposes to enter into, a war contract or subcontract. An application can be made only on a product which contributes to the effective prosecution of the war. These conditions, which were added last June to the mechanical rubber goods regulation, are now embodied in full in the rubber drug sundries regulation.

OPA said it may make an adjustment in the ceiling price where it finds that the ceiling is such that, taking into account the costs, profits and nature of the business, production is impeded or threatened, and that the adjustment will not cause an increase in the cost of living.

Manufacturers may file adjustment applications where they believe the specified conditions would exist if the National War Labor Board should grant a pending application for wage increases.

An adjustment also may be granted where the manufacturer agrees to make a reduction in the selling price of another commodity, or commodities, which will equal or exceed the total dollar amount of the adjustment requested.

Manufacturers may contract or agree on higher than existing ceiling prices for deliveries made during the pendency of an application for adjustment but no payment higher than prevailing ceilings may be received until the application is finally disposed of, and then the price received must not be higher than the new ceiling set by OPA.

RUBBER FOOTWEAR

New ceiling prices for waterproof rubber footwear—rubbers, arctics, gaiters and rubber boots—were established for manufacturers and wholesalers by OPA on January 20 with the issuance of Amendment No. 7 to M.P.R. 132 (Certain Rubber Footwear). Action on retail ceilings will be taken later. According to the terms of the amendment the effective date was to have been January 26 but Amendment No. 8 to the same regulation made the effective date January 20.

Because of demonstrated increased costs for footwear of this type, now made largely of synthetic rubber and reclaimed rubber, the new ceilings are approximately 8.9% over Victory Line maximums heretofore observed. It was emphasized, however, that the wearing quality of this new footwear more nearly approaches that of pre-Pearl Harbor footwear than did the Victory Line product.

The rubber footwear industry had asked for substantial increases in ceilings claiming that while synthetic rubber was 4 cents a pound cheaper than crude rubber this did not compensate for increased processing costs. It was further contended that other increases in cost, resulting largely from less efficient labor, made it impossible to absorb the cost increases. Compared with Victory Line maximum prices, the new ceilings show an increase of 25c per pair for heavy arctics, 20c for light arctics, 15c for work rubbers, 10c for gaiters, and 5c for dress rubbers.

Investigation by OPA into the costs of companies producing over 75 per cent of all waterproof rubber footwear revealed that, on the average, factory costs had risen 37 per cent between October 1941 and September 1943, with total costs up 35 per cent in the same period. Substitution of synthetic rubber increased average factory costs 19 per cent and total costs 17 per cent.

The cost study showed further that the firms accounting for 35 per cent of the production would suffer a loss on footwear produced by them unless they were permitted to increase their prices. In the case of one item, representing 30 per cent of total production, the industry on the average was not recovering costs.

By October 1943 the industry was using 80 per cent synthetic rubber to 20 per cent crude rubber apart from varying amounts of reclaimed rubber. It was estimated that on the basis of this rapid rise in costs the industry's total profits before income taxes for 1944 would be 56 per cent less than the average earnings in the period 1936-1939.

Ceilings for Canvas Footwear

In another action on January 20, OPA established dollars-and-cents wholesale and retail ceilings for canvas-topped rubber-soled shoes of vulcanized construction. This was accomplished in Amendment No. 9 to M.P.R. 229. Shoes of this type include tennis and basketball shoes, the production of which has recently been permitted after a lapse of a year and a half. Manufacturer ceilings for these shoes were established by OPA on December 9, 1943. The distributor ceilings now set are at levels existing in the fall of 1941 for standard quality items.

At the same time the title of Maximum Price Regulation 229 was changed to "Retail and Wholesale Prices for Certain Rubber Footwear" and a number of purely formal changes made in the body of the regulation incident to the change in title and coverage. The title had been "Retail and Wholesale Prices for Victory Line Waterproof Rubber Footwear."

Some Footwear Released

Because dealers have found that some types of footwear have not sold well under rationing in certain areas, individual retailers and jobbers of men's rubber boots and rubber work shoes may now sell limited quantities of excess stocks ration-free on authorization from OPA district offices. The released rubber footwear, covered in Amendment 6 to Ration Order 6A (Men's Rubber Boots and Rubber Work Shoes), is to be marked with official "non-rationed" stickers before it is sold ration-free.

Applications to make the ration-free sales are to be made in writing to OPA district offices, which will furnish all needed information. A minimum of 15 days will be required between the filing of an application and granting of the "non-rationed" stickers. The amendment was issued on January 25 and became effective January 29.

Earlier, on January 13, OPA issued Amendment No. 5 to the footwear ration order making it clear that the regulation also covered deliveries to "ship's stores."

RUBBER SOLES

Flat cord rubber soling slabs for shoes, including those made of low-grade friction scrap, have been given dollars-and-cents ceilings, on sales by manufacturers to the shoe factory trade, in Amendment No. 3 to M.P.R. 477 (Sales of Rubber Heels and Soles in the Shoe Factory and Home Replacement Trades).

Because the industry is making low-grade friction slabs for the first time, the ceilings set will be subject to review after additional production experience has been gained and fuller information is available as to costs. Previously, flat cord rubber soling slabs had "freeze" ceiling prices, based on March, 1942, levels.

The new ceilings are for eight different thicknesses and three different sizes of slabs. These prices are related to those already established for composition soling slabs in the same ratio as the prices of flat cord soles are related to the composition sole prices. The ceilings range from 85 cents for a five-iron slab 24 by 24 inches to $2.70 for a 14-iron slab 31 by 31 inches.

At the same time, OPA provided that ceiling prices now applicable for standard carbon black soles shall also apply to the small sizes of full soles cut out of fuel cell, belt and hose scrap, which are also being manufactured now for the first time. This action also will be subject to review later when full production costs are available.

The definition of "rubber" in the shoe factory rubber heel and sole regulation was also changed to include balata rubber. This was the original intent and the regulation has been so interpreted, but balata rubber has now been specifically included to avoid any possible confusion.

TIRE REPAIR MATERIALS

Specific dollars-and-cents ceilings for the basic types of tire and tube repair materials were established by OPA on January 28. Simultaneously, the tire and tube repair materials were removed from the rubber commodities regulation and brought under a revision of the camelback regulation. The new regulation is called Revised Maximum Price Regulation 131 (Camelback and Tire and Tube Repair Materials). It became effiective February 3.

The general level of ceiling prices is not changed as a result of the action. Previously, the sellers of tire repair materials had either "freeze" or formula price ceilings, and all inequalities are ironed out in the revised regulation. Some of the basic types of repair material for which specific price ceilings are now set include tire repair cushion stock, tread repair stock, tube repair gum, vulcanizing gum, and cold cure cement.

Types of repair material other than those specifically listed have ceilings based on a formula, which is similar to that formerly used, but which has been improved so as to provide a more workable method of pricing these commodities. Again, the general level of prices is not changed by this action.

Camelback ceilings remain the same under the revised regulation except that two new classifications are added, with their ceilings based on normal differentials in the industry. They are base stock and lug stock. On base stock, the new ceilings will be 36 cents per pound for Grade A camelback, and 31 cents per pound for Grade C camelback in five thirty-seconds of an inch gauge. In eight thirty-seconds of an inch gauge the respective ceilings will be 31 cents and 26 cents per pound. Lug stock ceilings are 34 cents for Grade A camelback and 29 cents for Grade C Camelback.

These ceilings apply to all sales by any seller to recappers and vulcanizers. On sales by manufacturers to jobbers, the same discounts granted in June, 1943, must be continued. Previously the regulation had covered only sales of camelback by manufacturers. Jobbers previously were under the General Maximum Price Regulation. Their ceilings remain the same under the revised regulation.

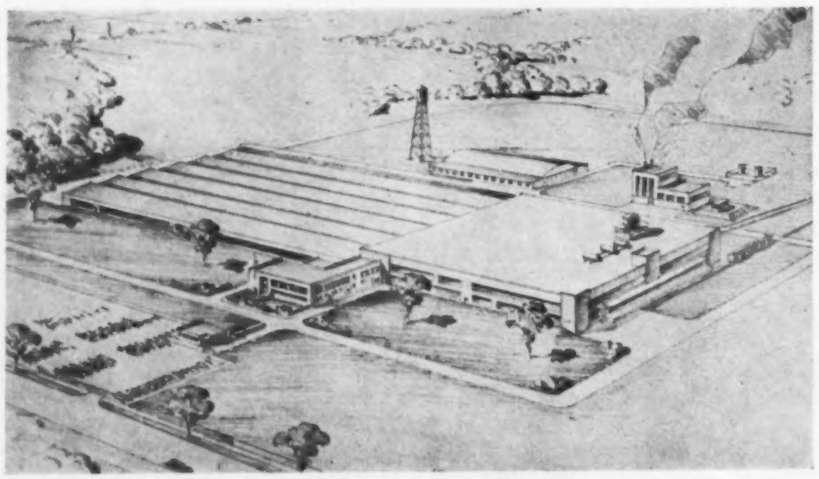
The revised regulation will not cover sales of camelback and tire and tube repair materials to the United States Government or any of its agencies. These sales are transferred to the regulation governing sales of rubber commodities for governmental use. Under that regulation, April, 1943, is the base period for determining price ceilings. This change has been made because the April, 1943, base date has been found more appropriate for determining ceilings of many rubber commodities sold to the Government.

To accomplish all of these changes, OPA issued Amendment No. 14 to M.P.R. 220 (Certain Rubber Commodities) and Amendment No. 6 to M.P.R. 403 (Certain Rubber Commodities Purchased for Governmental Use), in addition to issuing the revised regulation covering camelback and tire and tube repair materials.

BICYCLE TIRES

Manufacturers of new bicycle tires or tubes are now permitted to seek adjustment of their ceiling prices if these maximums impede or threaten to impede production. Such permission was made possible by the issuance of Amendment No. 3 to M.P.R. 435 (New Bicycle Tires and Tubes) by OPA on January 26.

DRAWING OF GOODRICH'S NEW TIRE PLANT IN MIAMI, OKLAHOMA



An engineering drawing of the new tire manufacturing plant to be built in Miami, Oklahoma, by the B. F. Goodrich Co. is reproduced above. Construction work on the new plant will be started within the next few weeks and the unit is scheduled for operation some time later in the year. The new plant is part of the company's expansion program to increase tire production facilities.

Applications for adjustment, which must be filed with OPA headquarters at Washington, must show the following: (1) that the applicant is an essential producer, (2) how the existing maximum prices are impeding or threatening to impede production, (3) the amount of relief desired, and (4) facts justifying the granting of that relief.

OPA also made clear which price regulations apply to sales of imported bicycle tires and tubes. Brands of these imported products must be listed specifically in an appendix to M.P.R.-435 to be covered by that regulation. Any unlisted imported tires and tubes come under the GMPR and the maximum import regulation.

COATED FABRICS

The base period to be used in determining maximum prices of coated and combined fabrics used in the production of combat vehicles or military airplanes, which includes knitted or woven fabric coated with rubber or synthetic rubber, has been changed from March, 1942, to April, 1943. This change occurs in Amendment No. 2 to M.P.R. 478 (Coated and Combined Fabrics), issued January 31 and effective February 5. It also applies to services rendered on these fabrics.

The April, 1943, base period already applied to those fabrics or services sold directly to the Government, and the new action reflects the original intention of OPA to establish such a base period for all military coated and combined fabrics.

In March, 1942, many of the coated and combined fabrics since perfected were in experimental production only. Since then numerous changes have occurred in their specifications and the use of a March, 1942, base period for pricing these fabrics and services would require manufacturers to use a formula in determining maximum prices. The April, 1943, base period relieves the manufacturer of this burden inasmuch as he can readily compare fabrics now being produced with similar ones fabricated last April.

OPA also has changed the coated and combined materials maximum price regulation to clarify the fact that the same person may be a manufacturer of some fabrics and a wholesaler of others, depending upon the function he performs with respect to the fabric in question. This interpretation has been placed on the regulation consistently in the past.

Earlier, on January 13, OPA issued Amendment No. 1 to the coated and combined fabrics regulation, this amendment making minor changes in methods of determining base prices. The same amendment put finished products made of coated or combined fabrics, cable wrapping tape materials, and barrage balloon cloth, among other materials, under the terms of the regulation.

MISCELLANEOUS ORDERS

Restrictions on the sale of multiple-jacket cotton rubber-lined fire hose have been considerably eased by an amendment to L-39 (Fire Protective, Signal and Alarm Equipment). The sale of such hose, which formerly required WPB authorization, is now permitted to fill purchase orders bearing a rating of AA-5 or better.

Under the terms of an amendment to L-20 (Chemicals) the use of cellophane is permitted in the manufacture of rubber products, as a substitute for Holland cloth in the backing of retreading stocks for tires, tire reliners, patches and sandblast stencils, and as a wrapping on friction and rubber tape. This represents a modification of previously prohibited uses.

BRAZILIAN AUTHORITIES TAKE OVER PROCUREMENT OF RUBBER SUPPLIES

As a result of conversations in Washington between Dr. Valentim F. Boucas, acting on behalf of the Government of Brazil, and Douglas H. Allen, president of the Rubber Development Corporation, it was announced on February 8 that a supplemental agreement between Brazil and the United States has been reached which provides for the payment of a premium of 33⅓% over the prices for natural rubber established early in 1942 in agreements between the two countries and that, furthermore, Brazil will undertake to assume all future development expenses in connection with rubber procurement.

The premium amounts to 15c per pound for the basic grade of Acre fine, washed and dried, rubber, the previous price for which was 45c per pound. It will be payable on all rubber received by Rubber Development during the period February 9, 1944, to March 31, 1945, and was provided to offset the increase in production costs that has taken place in Brazil since the spring of 1942 and to provide an incentive for maximum production.

In assuming all future development expenses, the Brazilian Government has agreed to aid the rubber program by making immediately available the sum of 10,000,000 cruzeiros (approximately $500,000). It has also relieved the Rubber Development Corp. of certain obligations which it had assumed with a view to stabilizing production costs in the Amazon. Studies are being made in other Latin American countries to determine whether production cost increases warrant a premium payment to assure maximum rubber procurement.

According to a statement made by Dr. Boucas, who heads the Brazilian Committee on Amazon Valley Labor and Food Supplies for Rubber Production, Brazil has been sending 70% of its rubber production to the United States since 1942 while shipments of tires and tubes manufactured in Brazil totaled 6,000 tons last year. He added that Brazil intends to expand rubber production and hopes to eventually produce about 100,000 tons for export annually to the United States but indicated that for purposes of protection his country would like a guarantee to supply the United States with 10% of its rubber needs.

It was also revealed recently that a five-year agreement has been concluded between Brazil and the United States which will serve to extend health and sanitation work in the Amazon and Rio Doce Valleys. This new agreement, which calls for a joint fund of $8,000,000, with Brazil contributing $5,000,000 and the United States the balance through the Institute of Inter-American Affairs, broadens the scope of the Inter-American health and sanitation program growing out of the Rio de Janeiro Conference of January, 1942.

Role of Air Transport

Some interesting information concerning the role played by air transport in the development of the Amazon country for rubber production was revealed recently by Vernon H. Ramsey, aviation operations manager in South America for the Rubber Development Corp. According to Mr. Ramsey, the Rubber Development transport system consists of four flying boats, three amphibians and two land planes, this equipment being supplemented by two planes operated for the company by a Peruvian concern and two more by a Brazilian concern. Headquarters are maintained at Manaos, and a network of airlines is carrying regularly food, drug and other supplies to thousands of tappers.

From Manaos, according to Mr. Ramsey, the air routes radiate into the upper reaches of the Amazon, into Peru, Colombia and Bolivia. The vast river system lends itself to the use of amphibian planes. To serve the airlines, a chain of radio and meteorological posts has been established, twelve operated by Rubber Development and others by airline companies. Air transport also is used on occasion to fly workers into rubber producing regions, Mr. Ramsey said, citing the movement of 541 tappers by plane into a remote area as an example.

In all, planes controlled by Rubber Development flew 9300 hours during 1943 and despite the difficulties of the country not a single casualty was reported. The planes are equipped with food, drugs, searchlight, radio, hammock and such other jungle needs in the event of an accident.

Some Other Developments

Rubber nurseries have been established in Peru at Iquitos and Oromina, under the supervision of personnel of a new agricultural experiment station at Tingo

Maria. An additional tract of 150 acres has been set aside by the government for a rubber plantation experiment, with the probability that two other areas of equal size will be designated for such purpose. The new tire factory at Lima, operated by the Compania Goodyear del Peru, which started operations last July, has reached an approximate production of 2,500 tires monthly.

Certain plants growing in northern Iraq have been found to secrete a viscous rubber-like substance, samples of which have been sent to the United States for analysis. The plants are reported to grow abundantly in some areas where the altitude ranges from 1,500 to 2,200 meters above sea level. They average 2 to 3 feet in height and have silver-colored leaves and small yellow blossoms. The stalks, which are thick in proportion to their size, secrete a white viscous matter which turns dark red in congealing.

Two plants grown extensively in China are reported to contain latex, one being the *Ficus pumila linn*, known as "geltin fruit," and the other *Chronemorpha macrophylla*. It is further reported that the Chinese Government will provide a subsidy of approximately $500,000 for experimentation.

Five additional dispensaries have been opened in northwest Ecuador for rubber workers, according to the Institute of Inter-American Affairs, bringing the total in that country up to seventeen. Each dispensary is staffed by a physician trained in tropical disease control, usually assisted by a laboratory technician.

The Russian *sagyz* plants are not flourishing at the Sacaton field station operated by the Bureau of Plant Industry of the Department of Agriculture in Arizona, where six acres were planted last spring for seed. Arizona summers are apparently too hot. Only one of the four species—*Kok-Sagyz*—produced any seed at all. There was never any intention of growing any of these plants in Arizona for rubber, the object of the Sacaton test being to obtain seed under irrigation for planting in cooler, less dry parts of the United States.

According to a recent statement by Rubber Director Dewey, domestic guayule production so far stands at 450 tons, while an additional 150 to 200 tons should result from harvesting operations now being carried on in Texas. The first commercial production will not be ready before the end of 1944.

Retreading Order Changed

Applications for tire retreading, recapping or repair equipment in excess of $85.00 retail value must now be filed with the field offices of the War Production Board rather than with the Office of the Rubber Director as heretofore, WPB announced on January 17. This action was taken in keeping with WPB's over-all decentralization program. The policy guiding the approval of applications, however, remains the same.

There are two exceptions. Applications for full circle molds and matrices for recapping airplane, earth mover, road grader or rear wheel tractor tires, and applications involving direct purchases by the armed forces or for export, shall continue to be forwarded to the Office of the Rubber Director at Washington.

The allocation of tire retreading, recapping and repair equipment is controlled by authorization on WPB Form 2521 (formerly Form PD-840) under Limitation Order L-61. There is no change in the application form to be used. The order controls not only new equipment having a retail value of more than $85, but it also includes curing bands and full circle and sectional matrices regardless of retail value.

Amendments to Ration Order

Three additional amendments to Ration Order 1A (Tires and Tubes) have been issued since our last report, as follows:

Amendment No. 66, issued January 17 and effective January 21, makes industrial type tires of specified sizes ration free when purchased for non-vehicular use. Tubes designed for use within these tires, which include 7.50-10 and 9.00-10 sizes, are also ration free. The amendment also states that all solid tires are removed from rationing and that tires or tubes needed for special uses in industrial and other operations may now be obtained by certification from OPA headquarters.

Amendment No. 67, issued January 31 and effective February 1, establishes a radical change in the eligibility of motorists, under rationing, for passenger car tires. This change is discussed in some detail above.

Amendment No. 68, issued February 2 and effective February 7, provides that essential truck operators in areas where recapping facilities are inadequate or unavailable may obtain a ration certificate permitting them to exchange with dealers a tire which needs recapping for a used tire or a new "war" tire. Two other minor changes were made in the amendment, including the eligibility of passenger cars operating as commercial motor vehicles and used exclusively to transport persons at funerals for new tires.

TIRE RATIONING SHIFTED FROM "MILEAGE" TO "OCCUPATIONAL" BASIS

The purpose for which a person drives his automobile, rather than the distance he drives it in a given month, hereafter will determine his eligibility, under rationing, for passenger car tires, according to the terms of Amendment No. 67 to Ration Order 1A, issued by OPA on January 31. Serious depletion of the supply of used passenger tires, coupled with inadequate stocks of new tires, compelled the shift in the tire rationing program from a "mileage" to an "occupational" basis.

In the new program OPA has abandoned the prior regulation that only those persons holding gasoline rations good for driving 601 miles a month or more can qualify for Grade I tires. In the future, any person who drives his car in connection with a highly essential occupation, regardless of his gasoline ration, may apply for a ration certificate good for the purchase of a Grade I tire or, if such a tire is not available, a certificate for a Grade III tire. The remaining supply of Grade III tires will go to persons doing occupational driving of a less essential character.

Adjust Tractor Tire Ceilings

Maximum wholesale prices for tractor tires and tubes when sold to a new class of purchaser, or by a new seller, have been adjusted upward by Amendment No. 9 to M.P.R. 143 (Wholesale Prices for New Rubber Tires and Tubes), issued February 8 and effective February 14. No increase at retail was permitted.

New ceilings on such tires and tubes will be determined by applying a uniform discount of 22½% to the maximum retail price of the tire or tube. Previously, the discounts allowed were 25% for tires and 30% for tubes, which are the discounts permitted for tires and tubes other than for tractors. The new rate will cause slightly higher prices at wholesale on these tractor sales.

The amendment also provides that a brand owner whose maximum wholesale prices for new natural and synthetic rubber tires and tubes are out of line with the general level may apply for an adjustment in his ceilings. Wholesale ceilings for these brand owners are established on the basis of discounts allowed in March, 1942.

Extend Price Exemption

Exemption from price control of new rubber tires and tubes made wholly or in part of Buna S when sold to the Federal Government has been extended. This exemption was effective until January 15, 1944, but the period has now been extended indefinitely, with the stipulation, however, that the exemption will automatically end on the effective date of OPA action setting ceiling prices for such tires and tubes.

Continued exemption from price control of these tires and tubes was accomplished in Amendment No. 8 to M.P.R. 119 (Original Equipment Tires and Tubes) and Amendment No. 5 to M.P.R. 415 (Certain Federal Government Purchases of New Rubber Tires and Tubes).

Correction

An article on "Maintaining Excitation for Motors" appeared on Page 245 of our December, 1943, issue. This article was credited to the Westinghouse Electric & Manufacturing Co. and did not cite an author's name. It was actually prepared by P. B. Steed of the Detroit, Mich., office of Westinghouse.

RECORD ATTENDANCE MARKS LOS ANGELES GROUP MEETING

Approximately 145 members and guests, a record gathering, attended the meeting of the Los Angeles Rubber Group, held at the Mayfair Hotel in Los Angeles on February 1. The meeting, which was sponsored by the Firestone Tire & Rubber Co., marked the resumption of monthly meetings for the group after a three-month lapse.

The main address of the evening was given by Dr. Rufus B. von KleinSmid, president of the University of Southern California, who was introduced by Leonard K. Firestone, president of the Firestone Tire & Rubber Co. of California. The central theme of Dr. KleinSmid's talk, which was on the subject "America's Position in the Postwar World," was that America must never again return to the isolationism attempted after the last world war but must recognize the fact that the political affairs of the world are very much her concern. Another feature of the program was the showing of color movies taken during last summer's outing at the Uplifters' Club.

During the brief business session, A. L. Pickard (Braun Corp.), the new president, formally announced that the group was no longer affiliated in any way with the American Chemical Society and that it had taken on the name of the Los Angeles Rubber Group, Inc. Permanent offices of the group are now maintained at the Mayfair Hotel. Several new members were voted in and a satisfying report was made by the treasurer.

A 75-piece set of china, donated by Firestone as a special prize, was won by C. H. Churchill (Dougherty), while three robes went to Walter Boswell (Thiokol), Gaelen Norton (Kirkhill Rubber), and T. Kirk Hill (Kirkhill Rubber), respectively. A $25.00 bond, donated by F. H. Banbury, was won by Murray Nixon (Goodyear).

Form New Resin Association

The Resin Adhesive Manufacturers Association, which includes concerns whose adhesives are based on phenol, urea, resorcin, melamine, vinyls and alkyd resins, was recently organized, with headquarters in the Tower Building, Washington, D. C. W. F. Leicester, vice-president of the Casein Co. of America, is president; C. F. Hosford, Jr., president of the Pennsylvania Coal Products Co., is vice-president; and J. E. Waller is secretary-treasurer. The primary function of the new organization is that of "offering cooperation in utilizing synthetic adhesives for war products and unified industry action on industry-wide problems in dealing with the armed services and other government agencies."

Sider Heads Loewenthal Co.

Jack Sider, associated with the Loewenthal Company, scrap rubber dealers, for over twenty years, and who has been

Jack Sider

serving as executive vice-president, has become president of that company, succeeding Edward B. Friedlander, retired. J. K. McElligott, also associated with the firm for a number of years, has been made executive vice-president. The company, one of the oldest in the scrap

J. K. McElligott

rubber business, maintains offices at 188 West Randolph St., Chicago, with Mr. Sider in charge, and at 159 Clewell St., Akron, with Mr. McElligott in charge. No other changes were made as a result of Mr. Friedlander's retirement.

NORTHERN CALIFORNIA GROUP HOLDS INTERESTING MEETING

An interesting meeting, the first in the new year, was held by the Northern California Rubber Group at the Hotel Claremont in Berkeley, Calif., on January 27. Approximately 55 members and guests were in attendance.

The speaker of the evening was F. H. Banbury, inventor of the famed Banbury mixer, who recently retired as manager of the Banbury mixing department of the Farrel-Birmingham Co., but who is continuing with that company in a consulting capacity. Mr. Banbury explained in detail the operation of his mixer and its application in the production of GR-S compounds for tires. At the conclusion of his address he answered numerous questions, particularly regarding temperatures and milling procedure. A sound film depicting the myriad rubber products made by the U. S. Rubber Co. for the war effort rounded out the evening's program.

The recently-elected officers for 1944 were formally announced at the meeting, these including Leonard Boller (Pioneer Rubber Mills), president; Russell Kettering (Oliver Tire), vice-president; and George B. Farwell (Reliance Rubber), secretary-treasurer. It was also announced that three new members of the board of directors had been elected, these being: John Liljegren (Pioneer Rubber Mills), George Petelin (Goodyear Rubber), and Lynn Shafer (American Rubber).

At the conclusion of the meeting a drawing was held for a $25.00 war bond, donated by Mr. Banbury. It was won by Dr. Kenneth Marple of the Shell Development Co.

Nervastral Dissolvable Compound

Nervastral Dissolvable Compound, described as a cement base for the manufacture of rubber cement, and which may be used as an extender or a substitute for crude rubber, is currently being marketed by the Armstrong Rubber Co., West Haven, Conn., under exclusive license from the Rubber & Plastics Compound Co., Inc. The compound is said to be soluble in the common rubber solvents, such as benzol or naphtha, without any addition of crude rubber. It can be compounded with ordinary rubber compounding materials and its physical characteristics are reported to compare very favorably to known rubber substitutes. The compound can also be dispersed in water by known patented methods of inversion or attrition, but Armstrong Rubber urges that the patent situation be carefully investigated for making water dispersions. Inquiries concerning Nervastral Dissolvable Compound may be addressed either to Armstrong Rubber or to the Rubber & Plastics Compound Co., 30 Rockefeller Plaza, New York 20, N. Y.

FOUR PAPERS ON RUBBER ARE GIVEN AT S.A.E. DETROIT CONCLAVE; INDUSTRIAL APPLICATIONS OF LESSONS LEARNED IN WAR DISCUSSED

Peacetime implications of wartime engineering shared the spotlight with current engineering services to the military at the 1944 War Engineering - Annual Meeting of the Society of Automotive Engineers, held January 10 to 14, in the Book-Cadillac Hotel, Detroit, Mich. The program focussed the attention of engineers upon peacetime potentialities of new materials, of new applications of materials, and of lessons learned in using motorized war equipment around the globe. Rubber was given a position of prominence on the program.

"The General Purpose Synthetic Rubbers in the Automotive Industry" was the subject of a paper presented by Dr. A. A. Somerville, of the R. T. Vanderbilt Co., which compared the properties of the general purpose synthetic rubbers as known today with the properties of natural rubber as these relate to the automotive industry. The paper showed that synthetics have many good and bad properties, and unfortunately all the good properties are not combined in any one rubber, leading to the conclusion that discrimination must be used in selecting the proper synthetic for a given purpose.

The automotive engineer, Dr. Somerville warned, must analyze his problems even more closely than in the past and demand only essential properties; for example, if flexing or fatigue life is paramount, he should demand that but should not at the same time insist upon cold resistance if that property is not essential. Many automotive parts may have to be redesigned, he said, to permit a synthetic to be used to its best advantage. It was pointed out in the paper that, although natural rubber combines in it more good properties (excluding oil and solvent resistance) than any of the GPS rubbers, the present emergency demands rapid completion of the conversion program.

Conversion to synthetic should not be made, however, on a cost basis, according to Dr. Somerville. The synthetics do differ from one another in price, he said, but the rubber goods manufacturer should be trusted to select and recommend regardless of cost that synthetic which his tests have shown to be most suitable.

Paper on Synthetic Tire Tests

Lt. Col. B. J. Lemon and Capt. J. J. Robson, of the Rubber Section, Ordnance Department, Army Service Forces, Detroit, delivered a paper on "Ordnance Keeps 'Em Rolling—What Fleet Men May Learn from Army Tests of Synthetic Tires." They pointed out that the abrupt stoppage of crude rubber imports early in 1942, following decisive enemy action in the Far East, called for immediate crystallization of a program to produce, test, and use synthetic rubber as fast as made available for tires for military and commercial motor transportation, and that the Ordnance Department and the rubber industry pooled their resources of synthetic rubber, of tire know-how, and of testing facilities to initiate a tire testing program heretofore unapproached in magnitude of effort.

The testing and performance of Ordnance natural rubber and synthetic tires, grouped according to increasing size, were discussed in detail. In the small size tire group, 100% synthetic has been used for months in volume production and has fulfilled the requirements of military service. In the medium size, large volume tire group, which includes sizes principally used for commercial fleets, a 90% synthetic tire has been adopted by the Army. Tests to date indicate, according to the authors of the paper, that these 90% synthetic tires will give mileages closely approaching those of natural rubber tires in normal military service.

The large tire size group—11.00 and up—represents the most difficult problem of conversion to synthetic and extensive testing of this group is under way, it was stated. The use of synthetic for inner tubes and for repairing and recapping also was discussed.

Synthetics in Aeronautical Field

The properties of various synthetic rubbers were reviewed and the problems in synthetic rubber applications peculiar to aircraft engines were discussed briefly by Gertrude Spremulli, research chemist, Ranger Aircraft Engines Division of Fairchild Engine & Airplane Corp., Farmingdale, L. I., N. Y., in a paper entitled "Synthetic Rubber Applications on Aircraft Engines."

Mrs. Spremulli pointed out that problems arise from the severity and variety of the service conditions. The procedure involved in selecting a suitable synthetic rubber for an aircraft engine application, she stated, is divided into application analysis and laboratory testing of synthetic rubber stocks and finished parts. The former involves determining the requirements for fluid resistance and general physical properties, according to the paper, establishing the limits of temperature which may be encountered and checking the design of the parts. The laboratory testing includes both the routine checks for conformance of the material with the requirements of the specification and special testing both on standard laboratory samples and on finished parts.

Mrs. Spremulli revealed that special laboratory testing of synthetic rubber vulcanizates typical of those available for use on aircraft engines revealed that: (1) synthetic rubber stocks vary greatly both in percentages and rates of weight loss during aging at 212° F.; (2) the changes in physical properties of the stocks tested during oil aging are a function of both the temperature of testing and of the aniline point of the oil; (3) the volume changes of synthetic rubber stocks are a linear function of the aromatic content of the fuels in which they are immersed; (4) the gum extracted by aromatic fuel from synthetic rubber stocks varies with the temperature and, to a much smaller extent, with the length of time of extraction; and (5) x-ray diffraction analysis provides a means of identifying some of the polymers and crystalline fillers in a stock, and also yields information regarding the particular size of the fillers present.

Tire and Track Flotation

"Tire and Track Flotation of Military Vehicles" was the subject of a paper presented by Lt. Col. J. E. Engler, of the Desert Training Command, Camp Seeley, Imperial, Calif. Sand, mud, and snow can present obstacles to military vehicles which are almost as tough to negotiate as man-made traps, the author stated. With proper vehicle design, however, these former obstacles can be made to become insignificant, he said.

It was pointed out in the paper that cross-country operation is affected by two vehicle characteristics—flotation and traction. What is adequate flotation on one terrain is inadequate on another, and the same is true of traction. With track-laying vehicles, it was said, these factors are rather absolute, but with wheeled vehicles inflation and tire stiffness may be important. Another important factor affecting wheeled vehicles is the number of wheels which are driving, for wherever the coefficient of traction is low, it is imperative that every wheel contacting the ground be able to contribute its share of forward tractive effort.

The only connection between the engine and the forward movement of a vehicle is the tires or tracks on which that vehicle rests, it was stated, and it is for this reason that the principles of flotation and traction must be adhered to or cross-country operation may be impossible.

Reclaimers Elect New Officers

Jean H. Nesbit, president of the U. S. Rubber Reclaiming Co., was elected president of the Rubber Reclaimers Association, Inc., to serve for 1944 at the annual meeting of that Association, held in New York City on January 18. V. H. Dingmon, president of the Xylos Rubber Co., was elected vice-president, and Mrs. Marion B. Miller was re-elected secretary-treasurer. The 1944 board of directors includes Allyn I. Brandt (Philadelphia Rubber Works), Robert E. Casey (Naugatuck Chemical), R. L. Lasser (Endicott Johnson), Fred E. Traflet (Pequanoc Rubber), and William Welch (Midwest Rubber Reclaiming). Headquarters of the Rubber Reclaimers Association are maintained at 533 East 82nd St., New York 28, N. Y.

CONVERSION TO SYNTHETIC TOPIC AT ONTARIO MEETING

Approximately 85 members and guests attended the meeting of the Ontario Rubber Section of the Canadian Chemical Association, held at the University of Toronto, in Toronto, on February 3. The speaker was George Vila of the Synthetic Rubber Division of the U. S. Rubber Co. who spoke on "The Replacement of Natural Rubber with GR-S."

Mr. Vila's talk was illustrated by a number of slides which dealt with outstanding characteristics of GR-S. Attention was drawn to the difference between the stress strain curves of natural rubber and GR-S. It was pointed out that this is due to the formation of a crystalline structure in rubber compounds on stretching. The addition of channel black reinforces GR-S to give about the same stress figures as those of crude rubber over the working elongation range. Good dispersion of pigments is necessary for best physical tests. Fine particle size, treated whitings give better physical tests than ordinary ground whitings. The modulus of GR-S compounds continues to increase with increasing cure with normal types of acceleration.

GR-S compounds are superior to rubber compounds in resistance to oxygen aging. This is the reason for the absence of reversion in GR-S compounds. The compounds are superior to rubber in air bomb aging. They exhibit poor tear resistance and have higher heat build-up than rubber stocks. Hysteresis of GR-S stocks is the opposite of resistance to crack growth. Improvement of one results in a decrease of the other property.

Tetramethyl - thiuram - monosulphide cures produce GR-S stocks that have a flat modulus, while with aldehyde amine acceleration, stocks can be obtained that show reversion. The heat build-up of these compounds is poorer than those using thiazole type of acceleration.

GR-S polymers break down at different rates and they show different changes in viscosity on mixing. Hot mastication of GR-S speeds up the tubing rate and gives smoother results than does cold breakdown of the polymer. Hot breakdown decreases tensile and increases modulus with poor rebound and increased cut growth. Breakdown temperatures should be kept below 300° F. to prevent degradation of polymer with loss of physical properties. The addition of para-phenylene-diamine protects the polymer against the effects of hot breakdown although it retards the rate of breakdown.

Chicago Rubber Changes Name

The name of the Chicago Rubber Clothing Co., manufacturers of raincoats and other rubber clothing, with offices and factory in Racine, Wisconsin, has been changed to Rainfair, Inc. No change was made in the management, personnel or products of the company.

KRISMANN GETS PROMOTION; GEORGE SMITH JOINS DUPONT

Emil H. Krismann

George W. Smith

The Rubber Chemicals Division of E. I. duPont de Nemours & Company has announced the promotion of Emil H. Krismann to Assistant Sales Manager of the Division. For the past eight years Mr. Krismann has been in charge of technical service on rubber, neoprene and other synthetic rubbers to the New England rubber industry and has been located in Boston. Prior to going to New England he was on the staff of the duPont Rubber Laboratory at Carney's Point, New Jersey, for several years. In his new position Mr. Krismann will devote part of his time to sales executive matters in the Wilmington, Del., office and part to technical service to the rubber manufacturing industry in all parts of the country.

George W. Smith, recently with the War Production Board in Washington as Assistant Chief, Intermediates Unit, Chemical Division, will replace Mr. Krismann as technical service representative in New England working from the Boston office of the duPont Company at 140 Federal Street. Mr. Smith is well known in the New England rubber industry because of his previous connections with the Barrett Company and Hood Rubber Company. He is a graduate of the Massachusetts Institute of Technology and resides at 4 Inverness Road, Winchester, Massachusetts. He is currently doing some special work at the duPont Rubber Laboratory and will take over his assignment in New England in April when Mr. Krismann reports to Wilmington.

Both Mr. Krismann and Mr. Smith are past presidents of the Boston Rubber Group.

Golf Ball Status Serious

Pointing out that warnings issued last fall that all old golf balls be turned in to be reprocessed have in the main gone unheeded, John Sproul, manager of the golf ball department of the U. S. Rubber Co., recently stated that the golf ball situation was now most serious. According to Mr. Sproul, there were approximately 2,000,000 dozen new golf balls sold through all outlets in 1941 while in 1943 no new ones were manufactured and the quantity of reprocessed golf balls available from all sources amounted to only 25% of the new ones sold during 1941. This year the number of golf balls turned in for reprocessing has been negligible to the point where those actually available will be far less than the 1943 figure unless golfers cooperate.

Changes in Anaconda Board

Arthur H. Quigley, executive vice-president of the American Brass Co., a subsidiary of the Anaconda Copper Mining Co., has been elected chairman of the board of the Anaconda Wire & Cable Co., also a subsidiary, as well as chairman of its newly-created executive committee. Cornelius F. Kelley and J. R. Hobbins, chairman and president, respectively, of the parent company, have been elected directors of Anaconda Wire, as well as John A. Coe, Sr., chairman of American Brass, Clark S. Judd, president of American Brass, and W. H. Hoover, general counsel of the parent concern. W. K. Daly and James Dickson, comptroller and secretary-treasurer, respectively, of the parent concern, have resigned as directors of Anaconda Wire.

RUBBER SYMPOSIUM PROGRAM COMPLETED BY THE A.S.T.M.

The program for the Synthetic Rubber Symposium which will feature the 1944 Spring Meeting of the American Society for Testing Materials, to be held at the Netherland Plaza Hotel in Cincinnati, Ohio, next month, as reported in our previous issue, has been completed. The Symposium, which will be held on Thursday, March 2, at the Netherland Plaza, will comprise a total of thirteen papers, presented at morning and afternoon sessions, as follows:

Morning Session: The Origin and Development of Synthetic Rubbers, Harry L. Fisher (U. S. Industrial Chemicals); Physical Tests of Synthetic Rubber Products, Leslie V. Cooper (Firestone); Specifications for Synthetic Rubber Compounds, M. J. DeFrance (Goodyear); Physical Properties of Synthetic Rubbers, John M. Ball (Vanderbilt); Processing Characteristics of Synthetic Rubbers and Their Use in Extruded Products, A. E. Juve (Goodrich).

Afternoon Session: Synthetic Rubber Tires and Inner Tubes (speaker to be announced); Hose and Belting Made from Synthetic Rubber, W. L. White (Manhattan Rubber); Use of Synthetic Rubbers in Molded Products, Merle Sanger (General Tire); Synthetic Sponge Rubbers, Louis P. Gould (Inland Manufacturing); Hard Rubber Products, Walter H. Juve; Use of Synthetic Rubbers for Insulated Wire and Cable, R. A. Schatzel (General Cable); Footwear and Protective Coatings, Stanton Glover (U. S. Rubber); Synthetic Rubber Adhesives, Fred J. Wehmer (Minnesota Mining).

It is pointed out that except insofar as necessary for background information the authors do not plan to deal with the chemistry or manufacture of the synthetics, but instead will give the latest information on properties of materials and other features that would be of concern especially to those who are using the synthetic rubber products. The program was developed by a special Symposium Committee headed by Arthur W. Carpenter, Manager of Testing Laboratories, B. F. Goodrich Co., Akron, who is also secretary of A.S.T.M. Committee D-11 on Rubber Products.

Those attending the Symposium will also have an opportunity to hear John L. Collyer, president of the B. F. Goodrich Co., discuss the development of synthetic rubbers as well as some of the economic and industrial angles they have presented. Mr. Collyer was scheduled to address the monthly meeting of the Technical and Scientific Societies Council of Cincinnati next month and this address has now been scheduled for the evening of March 2. It will be made in the Taft Auditorium in Cincinnati.

The A.S.T.M. has also announced that a Symposium on Plastics will be held at Franklin Institute in Philadelphia, Penna., on February 22 and 23 in connection with meetings to be held by Committees D-9 on Electrical Insulating Materials and D-20 on Plastics. A feature of this Symposium will be the presentation by Dr. G. M. Kline of the National Bureau of Standards of information and data furnished by seven technologists covering salient features of leading plastic families. Full details on this Symposium can be secured from F. G. Tatnall, Baldwin-Southwark Division, Baldwin Locomotive Works, Philadelphia, Penna.

Coming Events

Feb. 28-Mar. 3. A.S.T.M., Spring Meeting, Netherland Plaza Hotel, Cincinnati, Ohio.

Mar. 7. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.

Mar. 10. Chicago Rubber Group, Morrison Hotel, Chicago.

Mar. 10. Montreal Rubber Group, McGill University, Montreal.

Mar. 14-15. N.A.W.M.D., Annual Meeting, Hotel Astor, N.Y.C.

Mar. 24. R. I. Rubber Club, Crown Hotel, Providence, R. I.

March 28-30. Tenth Annual Chemurgic Conference, St. Louis, Mo.

Mar. 31. New York Rubber Group, Building Trades Club, N.Y.C.

Apr. 3-5. A.S.M.E., Spring Meeting, Birmingham, Alabama.

Apr. 3-7. A.C.S., 107th Meeting, Cleveland, Ohio.

Apr. 26-28. Rubber Division, A.C.S., Spring Meeting, Hotel Commodore, New York City.

June 26-30. A.S.T.M., 47th Annual Meeting, Waldorf Astoria, N.Y.C.

Montreal Hears N. H. Grace

Approximately 60 members and guests attended the regular monthly meeting of the Rubber & Plastics Division, Montreal Section, Society of Chemical Industry, held at McGill University in Montreal on January 14. Dr. N. H. Grace, of the National Research Council, Ottawa, spoke on "Canadian Grown Rubbers and Resins in Relation to the Synthetic Rubber Program." Dr. Grace's talk was largely informal in nature. He stated that because of high labor costs the production of *kok-saghyz* in Canada was not too successful, but from the economic viewpoint milkweed rubber had more potentiality. He also described the operation of the pilot plant maintained at Ottawa for the extraction of rubber from various Canadian-grown plants. The group was also scheduled to hold a meeting on February 11 at which Dr. W. Gallay, of the National Research Council, was to talk on "Some New Developments in Plastics."

RUBBER DIVISION CLARIFIES POSITION OF LOCAL GROUPS

The position of the various local rubber groups throughout the country, such as the Boston, New York, Akron and Los Angeles groups, in relation to their standing with the American Chemical Society or its Division of Rubber Chemistry, has never been clearly defined and from time to time the Executive Committee of the Division was called upon to make decisions in such instances as arose. It is now made clear that the local groups were never an integral part of the Rubber Division and that they have complete autonomy.

It is true that in most cases local groups were organized with the aid and assistance of the Rubber Division, but in order that there might be some basis on which to resolve specific problems concerning the relationship between local groups and the Division, the Executive Committee at the meeting held in New York last October adopted the following statement or resolution as defining the status of the groups which have been sponsored by the Division:

"The Division of Rubber Chemistry sponsored the formation of the several Local Rubber Groups, primarily to encourage the dissemination of technical information and the Division is gratified that the Groups have achieved such outstanding success in the period since their creation in 1927.

"At the time of their organization the Local Rubber Groups were not made an integral part of the Division and, accordingly, the Division now wishes to emphasize that the Groups have complete autonomy and that their relationship with the Division and with the American Chemical Society is entirely informal.

"The Division is only too pleased to assist the Local Groups in any manner that may seem advantageous. The Division recognizes that these Groups fill an extremely important function in disseminating technical information and are a valuable adjunct of the Division in coordinating practical and technical activities in the principal rubber centers to the benefit of rubber technologists and the rubber industry."

In making known this statement or resolution to the various local rubber groups, the Division also emphasized the fact that membership in one of the local groups does not entitle one to register at meetings of the A.C.S. or of the Division of Rubber Chemistry at the same low fee enjoyed by members of the Society and that the local groups were not authorized to use the seal or insignia of the Society on membership cards, letterheads, yearbooks, etc.

It was also emphasized that the statement or resolution was adopted by the Executive Committee of the Rubber Division not in any criticism of any local rubber group but rather to clarify a problem which long called for clarification.

New Plastic Offered

Polythene, a new plastic adaptable to the manufacture of products as varied as collapsible tubes for toothpaste, waterproof coatings, piping, adhesives, and insulation for electric wiring and cables has been introduced by the Plastics Department of E. I. du Pont de Nemours & Co., Wilmington, Del. The new plastic, according to the company, represents the culmination of experimentation and development undertaken five years ago and coming originally from Imperial Chemical Industries, Ltd. Polythene is the generic name for the tough plastic manufactured by the polymerization of ethylene. Outstanding properties of the new material, Dupont states, include flexibility and toughness over a wide range of temperatures, unusually good resistance to water and to penetration by moisture, chemical alertness, and excellent electrical properties. It is available in substantial quantities only by specific allocation for war purposes.

Labels for Synthetic Tires

For purposes of quick identification, tires made with varying amounts of synthetic rubber have been given specific designations, which appear on the tires themselves. At last reports, the following designations were in use:

S-1—80% synthetic tread on natural rubber carcass.

S-2—50% synthetic tread on natural rubber carcass.

S-3—100% synthetic tread, 100% synthetic carcass. An all-synthetic tire.

S-4—90% synthetic, 10% natural rubber, distributed throughout the casing as the manufacturer may desire.

S-5—100% synthetic tread on natural rubber carcass.

S-6—70% synthetic, 30% natural rubber, distributed throughout the casing as the manufacturer desires.

S-7—Alternate for S-5 permitting the manufacturer to vary the amounts of synthetic and natural between carcass and tread.

Introduce Statex 93

Statex 93, a high modulus furnace carbon, said to display high rebound and low heat build-up to a degree remarkable for any carbon in the reinforcing range, has been introduced by the Binney & Smith Co., New York City. The new furnace carbon, which is in the six acre surface range, is recommended by the company for compounds requiring good reinforcement and abrasion resistance, firmness, high resilience and low heat build-up, and good processing.

The Society of Automotive Engineers has been presented with the first U. S. Army Ordnance Distinguished Service Award. The award was made "in recognition of outstanding and meritorious engineering advisory services in war and peace; in design, manufacture and maintenance of Ordnance material."

NEWLY-ELECTED OFFICERS FOR 1943-44 OF THE BUFFALO RUBBER GROUP

G. W. Cassell

G. Van Nimwegen

As recently reported, G. W. Cassell, plant manager of the General Cable Corp. at Buffalo, N. Y., and G. Van Nimwegen, of the research department of the Carborundum Co. at Niagara Falls, N. Y., were elected chairman and vice-chairman, respectively, of the Buffalo Rubber Group to serve for 1943-44. Biographies of both men follow:

Mr. Cassell received a B.S. in chemistry from the University of Virginia in 1924 and during 1924 and 1925 served as an instructor in chemistry at St. John's College in Annapolis, Maryland. In 1925 he entered the rubber field as a technologist for the former Fisk Rubber Co. at Chicopee Falls, Mass., serving with that company for three years. He joined General Cable in 1928 as a rubber technologist at the Rome, N. Y., plant, becoming assistant technical director in 1936. In 1940 Mr. Cassell was named superintendent of the rubber mill at the Perth Amboy, N. J., plant, and two years later was transferred to the Buffalo plant as plant manager.

Mr. Van Nimwegen was born in Paterson, N. J., on December 9, 1902. He matriculated at New York University, receiving his B.S. in Chemical Engineering in 1925. In the same year he entered the employ of the American Hard Rubber Co., serving in the laboratory and factory of the company's Butler, N. J., plant until 1936 when he left to join the research department of the Carborundum Co. Mr. Van Nimwegen is married and has two sons. His fraternities include Delta Sigma Phi and Iota Alpha, the honorary engineering society.

Changes at Dayton Rubber

Several important changes were recently made in the executive set-up of the Dayton Rubber Manufacturing Co., Dayton, Ohio. H. S. Mooradian, superintendent, was made vice-president in charge of production, and Joseph Rockoff, chief chemist, vice-president in charge of development. T. C. Davis, formerly manager of industrial sales, is now vice-president in charge of mechanical sales planning and experimental sales, and T. D. Slingman, formerly New York district manager, is vice-president in charge of mechanical sales. I. Eisbrouch continues as vice-president in charge of tire sales.

North American Philips Co., Inc., Dobbs Ferry, N. Y., has purchased all the fixed and tangible assets of its affiliate, Philips Metalix Corp., including grounds and factory at Mount Vernon, N. Y. The latter organization has been manufacturing x-ray tubes and equipment for the medical profession, hospitals, industry and the government since 1934.

Named Seiberling Officers

Under a new program dividing the duties of the office held by the late W. E. Palmer, the Seiberling Rubber Co., Akron, has named W. P. Seiberling secretary of the company and H. E. Thomas assistant treasurer. W. A. M. Vaughan continues as vice-president and treasurer. Mr. Seiberling, a son of F. A. Seiberling, company chairman, has been with the company since its founding in 1921 and has served as accessories and repair materials sales manager for the past several years. Mr. Thomas, associated with the company since 1926, has served as assistant secretary under Mr. Palmer since 1927.

The first two booklets in a series of five guides to postwar preparation have been issued by the National Association of Manufacturers, 14 West 49th St., New York 20, N. Y. The first is a guide to internal organization for corporation postwar planning and the second is intended as a guide to postwar sales planning. Copies are available on request to the Association.

C. P. HALL CO. COMPLETES QUARTER-CENTURY OF SERVICE

The C. P. Hall Co., manufacturers and distributors of chemicals and compounding ingredients to the rubber and allied fields, which maintains headquarters in the First Central Tower in Akron, Ohio, is currently rounding out its twenty-fifth year of service. The growth of the company has been steady throughout that period.

Backbone of the company is C. P. Hall

C. P. Hall

himself, who heads the company as president. Born in Ohio, Mr. Hall received his early education and training at Huntington, West Virginia, where his father was connected with the Standard Oil Co. of New Jersey, and his first employment was with that company. In 1914 he returned to Ohio, residing in Fitchville for two years, and subsequently he went to Akron to join the purchasing department of the Firestone Tire & Rubber Co.

It was during his work with Firestone that Mr. Hall conceived the idea that some of the active chemical manufacturers with headquarters outside of Akron could service local customers far better if they had direct representation in that city. Accordingly, in 1919 he resigned from Firestone and started on his own as a manufacturer's representative. Within 10 years the business had expanded from local to national interests, with branch offices in Boston and Los Angeles.

Shortly after its organization, the C. P. Hall Company began to job some items, and in 1926 entered the manufacturing field with the development of Para-Flux, an asphaltic flux product used as a devulcanizing and dispersing agent. Soon thereafter a number of other company-developed products were placed on the market, including Stabilite, Stabilite Alba, SPDX and Phenex, all made under the Morton patents, and all of which are now standard products of the trade.

Today, the company maintains a staff of about twenty in its Akron office, including, in addition to Mr. Hall, the popular A. E. Warner, who is vice-president of the firm, and C. R. Hall, the secretary. S. A. Davis, who opened the Boston office in 1928, is still with the company as representative in the Eastern territory, while R. D. Abbott heads up the C. P. Hall Co. of California as vice-president. J. A. Baty, formerly with the U. S. Rubber Co., recently joined the Akron office as technical director.

Consumption of Cotton

According to the latest figures compiled by the National Cotton Council of America, a total of 592,700 bales (478-pound net weight) of cotton went into the manufacture of tires in 1942, of which 590,700 went into cords and fabrics and 2,000 into interliners. This compares with 878,780 bales in 1941, 745,000 bales in 1940, and 633,100 bales in 1939. A total of 50,000 bales in 1942 were consumed in the manufacture of hose, of which 28,430 went into fire hose and 21,570 into all other types. A total of 20,390 bales went into the production of rubber shoes, which compares with 33,510 in 1941, 27,180 in 1940, and 28,270 in 1939.

Form Tire Cord Committee

The formation of an industry advisory committee to represent the synthetic yarn and tire cord industry was recently announced by WPB, with A. L. Freedlander as the government presiding officer. Members of the new committee are: J. L. Bitter (North American Rayon), Martin Castricum (U. S. Rubber), J. L. Moritz (American Enka), Frank Griffen (American Viscose), M. H. Richardson (Firestone), Hayden B. Kline (Industrial Rayon), H. J. White (DuPont), E. T. Lessig (Goodrich), and J. E. McCarty (Goodyear). The initial meeting of the committee was held on January 25.

Bascom Joins Hycar Chemical

Roger C. Bascom, formerly chief chemist of the Standard Products Co., Port Clinton, Ohio, and prior to that connected with the Converse Rubber Co. and Rubatex Products, Inc., has joined the technical service staff of the Hycar Chemical Co., Akron. He will serve the New England, Eastern New York State and Northern New Jersey territories, operating out of Milford Conn. Mr. Bascom is a graduate of Northeastern University of Boston.

SURPLUS OF CRUDE RUBBER PRESENTS PROBLEM TO JAPS

According to the U. S. Bureau of Foreign & Domestic Commerce, Japanese authorities in the Netherlands Indies appear actually at a loss what to do with the huge surpluses of rubber they have collected. With export limited to occasional shipments to Japan, owing to lack of cargo space, the Japanese claim that rubber factories are being erected in various sections of the Archipelago for the manufacture of rubber goods for the army and for local use.

A recent Domei radio report told of an "unnamed" number of such factories which are in course of construction in Macassar, on the island of Celebes. "Aiming at the manufacture of simple rubber articles," the broadcast said, "an 'unnamed' number of factories have been making rubber gloves and icebags since April of this year. Already they are turning out 'unnamed' thousands of dozens per month. With the advent of the rainy season, they have now started making rubber boots and cloth for raincoats. The showing is 'most excellent.'"

In sharp contrast with this apparent abundance, the Japanese are beginning to feel more and more the pinch caused by the shortage of *cotton*. How serious this shortage has become is evident from a recent broadcast from Tokyo, announcing that the authorities had been obliged to convert a number of cotton mills to the manufacturing of rubber goods. "In keeping abreast with changes in industry at the time of decisive battles," the announcement said, "several outstanding change-overs have already been accomplished.

"The Tokyo Spinning Co. is entering the rubber industry, with an initial capital of 8,000,000 yen. The Kureha and Kanebo spinning companies have also switched to rubber. The Tokyo Rayon Co., with a capital of 19,500,000 yen, has decided to dissolve its present organization; in its place a new rubber company will be formed."

Akron Holds Meeting

The Winter Meeting of the Akron Rubber Group was held at the Portage Hotel in Akron on February 4, with approximately 165 members and guests in attendance. Louis Hochberg, of the Goodyear Tire & Rubber Co., was the principal speaker. Mr. Hochberg, who was in Java as head of the Goodyear factory and escaped in a flat-bottomed, inter-island cattle boat to Australia after the Jap invasion, talked about his trip to Java and his return. A Nominating Committee, consisting of Curt Harwick (Standard Chemical) as chairman and Bert Taylor (Goodrich), Fred Theiss (Goodyear) and William Whittaker (Herron Bros. & Meyer), was appointed to prepare a ballot for presentation at the Spring Meeting.

NAMES IN THE NEWS

DR. FREDERICK W. BREUER, until recently active with the Polymer Research Branch of the Office of the Rubber Director at Washington, D. C., is now associated with the Central Technical Laboratory of the Armstrong Cork Co. at Lancaster, Penna.

C. L. SHREINER, vice-president and sales manager of the Chardon Rubber Co., was recently elected president of the Chardon (Ohio) Chamber of Commerce. He will serve throughout the current year.

R. A. MAXWELL, associated with the B. F. Goodrich Co., Akron, for the past ten years, has been appointed in charge of all tire sales except airplane in the company's combined automotive, aviation and government sales divisions. He has been on leave during the last year serving with the Office of the Rubber Director in Washington.

DONALD J. BRIGHTMAN, who entered the rubber field with Fisk in 1919, has been appointed general sales manager of the Textile Division of the U. S. Rubber Co. He will take charge of sales and distribution of all products now being made in the company's five textile mills.

JAMES W. YANDA, long associated with development engineering, has joined Chemical Research for Industry, Inc., Cleveland, Ohio, as general manager in charge of research chemical development engineering.

THOMAS A. KNOWLES, associated with Goodyear since 1927 and long affiliated with the lighter-than-air activities of the company, has been named a vice-president of the Goodyear Aircraft Corp.

SERING D. WILSON, who has been manager of the industrial division of the Homasote Co., Trenton, for the past few years, has been elected vice-president in charge of sales of that division, which includes the shoe products developed by the company.

HARRY M. RAMSAY, manager of the fuel cell department of the U. S. Rubber Co. for the last two years, has resumed his previous position as assistant sales manager of the company's Fisk Tire Division.

G. LEROY SCHEINLER, vice-president of the Robert Badenhop Corporation, New York, was re-elected governor of the Rubber Group of the Commodity Exchange, Inc., last month. PHILIP B. WELD was re-elected for a second term as president of the Exchange.

CARL A. CRAFTS, formerly district manager at Sacramento, Calif., for the Goodyear Tire & Rubber Co., has been appointed manager of the tire treading and repair division of that company. He will maintain headquarters at Akron.

W. A. MOORE, who has been general manager of the Armstrong Tire & Rubber Co., Natchez, Miss., practically since the organization of that company, was recently made vice-president and general manager of the concern.

ERVIN C. POPE, vice-president of the Cleveland Liner & Manufacturing Co., Cleveland, Ohio, manufacturers of Climco Processed Liners and Linerette Interleaving Paper for light-weight rubber stocks, was recently made president of that company.

HENRY F. SCHIPPEL, prominent tire engineer associated with the B. F. Goodrich Co. since 1925, has been named manager of the Aeronautical Section of the Field Engineering Department of the Tire Division of that company.

WILLIAM J. SECREST, chief electrical engineer of the Firestone Tire & Rubber Co., was recently elected president of the Akron District Society of Professional Engineers.

A. M. BYERS, who recently resigned as vice-president and sales manager of the General Magnesite & Magnesia Co., Philadelphia, after 27 years with that organization, has joined the Michigan Chemical Corp., Saint Louis, Michigan, in charge of their sales of light and heavy calcined magnesia to the rubber and allied trades.

JESSE M. WEAVER, who has been employed as research and development engineer of the General Asbestos & Rubber Division of Raybestos-Manhattan, Inc., at North Charleston, S. C., has been transferred to the company's United States Asbestos Division at Manheim, Penna.

RICHARD W. CORNS, associated with the B. F. Goodrich Co., Akron, since 1934, and who has served in the traffic department since July, 1941, has been appointed assistant general traffic manager of the company.

DR. DONALD PRICE, formerly technical director of the organic research laboratory of the National Oil Products Co., Harrison, N. J., has joined the Interchemical Corp., New York, where he will coordinate the research projects of the corporation in the pharmaceutical and fine chemical field.

New Goodrich Appointments

W. S. Richardson, head of the recently-created chemical division of the B. F. Goodrich Co., Akron, has announced the following appointments in the division: William I. Burt, general manager of all plants; Dr. Frank K. Schoenfeld, director, technical and development; Dr. Victor E. Wellman, director of purchases; and Harry E. Foster, general auditor. The division operates the government-owned synthetic rubber plants at Louisville, Ky., and Borger and Port Neches, Texas, as well as raw materials plants at Louisville, Akron and Niagara Falls, N. Y.

Grote Opens Akron Office

H. Walter Grote, who recently joined the Wilmington Chemical Corporation, New York, as mid-western sales representative, has opened headquarters at 1322 First Central Tower, Akron 8, Ohio. Mr. Grote was associated with the United Carbon Co., Charleston, W. Va., as technical representative and supervisor of laboratories from 1932 until he resigned to join the Wilmington organization. The telephone number of Mr. Grote's new office is JEfferson 2164.

DANIEL D. DOWNES, formerly associated with Newport Industries, Inc., is now sales representative for the Allied Asphalt & Mineral Corp., New York City. GEORGE J. O'SULLIVAN was recently elected vice-president and general manager of the company, succeeding G. S. ZEIGLER who resigned to organize his own concern.

ALBERT W. HENDRICKSON, until recently director of industrial relations for the Kellett Aircraft Corp., Philadelphia, has joined the Farrel-Birmingham Co., Inc., as director of employee services. He will be in charge of activities at the company's three plants.

DR. ALBERT L. ELDER, who has been acting as Federal penicillin coordinator and who was closely associated with the development of butadiene facilities under the government synthetic rubber program, will join the Corn Products Refining Co. as director of research on March 1. He will maintain headquarters at the Chicago laboratories.

PAUL B. MEANS, manager of the Atlanta, Georgia, branch of the Seiberling Rubber Co. for the past four years, has been appointed manager of the company's Diversified Products Department, with headquarters at Barberton, Ohio.

HENRY J. PAULSEN, chief engineer of the Mansfield Tire & Rubber Co., Mansfield, Ohio, was recently elected vice-president of the North Central Chapter of the Ohio Society of Professional Engineers.

FINANCIAL NEWS

U. S. RUBBER'S NET SALES REACH NEW ALL-TIME PEAK

Consolidated net sales of the U. S. Rubber Co. for the year of 1943 reached $422,271,343, according to a statement made to stockholders. These sales established a new record for the company, being 45% greater than the 1942 total of $290,992,037 and comparing with the previous all-time high of $315,345,328 reported in 1941. The 1943 sales do not include the production in government-owned plants operated by the company on a cost-plus-fixed-fee basis.

Net income after provision for taxes, renegotiation and post war contingencies amounted to $14,163,554 for the year which, after allowing for $8 a share on the preferred stock, amounted to $5.09 a share on the common stock. This compared with 1942 net income of $8,381,011 or $1.82 a share on the common stock. In 1942 the company suffered war losses of $15,487,414 due chiefly to Japanese seizure of its rubber plantations.

Direct taxes totalling $59,193,095 were charged against operations for the year, compared with $26,473,955 for 1942. In addition the company collected from its employees during the year, for payment to the Government, $13,407,269 of Victory and withholding taxes, and $2,071,667 of social security taxes. United States Treasury Savings Notes at a present value of $32,257,548 were available on December 31, 1943, for partial payment of federal income taxes, and are shown on the consolidated balance sheet as a reduction of the accrued tax liability.

The balance sheet, as of December 31, 1943, showed current assets of $154,260,077, including cash of $34,803,321, compared with current assets of $138,670,730 and cash of $14,996,319 at the close of 1942. Accounts and notes receivable from customers, less reserves for doubtful accounts of $2,095,670, amounted to $47,855,054, contrasted with comparable sums of $1,843,723 and $39,647,730 in the preceding year. Inventories totaled $69,580,780 against $78,127,630.

Working capital increased to $108,877,046, a gain of $5,718,273 over the previous year. Current liabilities, including accounts payable of $16,171,233, totaled $45,383,031. This compared with $17,646,993 and $35,511,957 respectively in 1942. Accrued federal income taxes and provision for renegotiation totaled $47,803,262.

A total of $190,171,000 was paid in wages and salaries during 1943 to an average of 89,023 employees. As of December 31 last a total of 13,090 men and women employees had responded to the call for military service.

Under the payroll deduction plan for the purchase of War Savings Bonds, installed in May, 1941, employees bought $26,419,850 maturity value of bonds to December 31, 1943.

First mortgage and collateral trust 3⅝ per cent bonds, which constitute the only funded debt of the company, amounted to $31,725,000 at December 31, 1943, a further reduction of $2,838,000 from the 1942 total.

GENERAL TIRE & RUBBER CO. REPORTS PROFIT OF $1,740,084

Based on record-breaking sales of $51,987,521, an increase of 57.8% over the $32,944,784 for the previous year, General Tire & Rubber Co. reports a net income of $1,740,084, equal to $2.75 a common share, for the fiscal year ended November 30, 1943. This compares with $1,382,963, or $2.37 a common share, in the 1942 period. Before taxes, provisions for estimated renegotiation refund, and for contingencies, earnings for the year just ended amounted to $7,015,084.

The report also revealed that General Tire had retired all of its 6% cumulative preferred stock in November, 1943, and issued $6,500,000 of new 4½% preferred stock, adding about $4,000,000 to the company's capital.

Rome Cable Corporation

December Quarter: Net profit of $125,069, subject to year-end and war emergency adjustments, which is equal to 66c a share and which compares with $97,546, or 51c a share, for the corresponding period of 1942. For the nine months to December 31, net profit amounted to $426,112, after $1,513,569 taxes and $125,000 contingency reserve, equal to $2.24 a share, against $215,064, or $1.12 a share, for the corresponding period of the previous year.

New Jersey Zinc Co.

For 1943: Net income of $6,884,725, equal to $3.50 a share, which compares with $7,231,396, or $3.68 a share, reported for the previous year. In the December quarter, net income amounted to $1,700,116, or 86c a share, compared with $1,750,606, or 89c a share, in the final quarter of 1942.

A special edition of the *Wingfoot Clan*, Goodyear house organ, was recently issued for the personnel of the St. Marys, Ohio, plant, to show them graphically and entertainingly how the products they make figure actually in the war effort.

Named Technical Representative

Albert W. Holmberg

An extensive record of research and laboratory work has been culminated by the appointment of Albert W. Holmberg, chief chemist in the latex and dispersions department of the Naugatuck Chemical Division of United States Rubber Company, to technical representative for the sales department of that division. He has been associated with the company since 1909 when he started as a laboratory helper at Mishawaka, Indiana, after graduating from college.

Mr. Holmberg's first assignment was connected with the transfer from the laboratory stage to a factory scale in the extraction of guayule rubber. Since that time he has worked extensively with organic chemicals for use as accelerators and anti-oxidants. He has directed and participated in developments in footwear compounding, wear tests, chlorinated rubber, and liquid latex—its handling, processing and use in manufactured products.

This laboratory research work, which was conducted for the company in New York, New Haven, Mishawaka and Naugatuck, included dipped products, web tire fabrics, pile fabrics, impregnation of paper and fabric, etc.

On November 1, 1932, Mr. Holmberg was assigned as supervisor to the latex, Lotol and dispersions department of Naugatuck Chemical, where he continued additional laboratory research for the department on numerous subjects.

This new assignment as technical representative comes to him as a result of his wide experience and knowledge of the products manufactured and handled by the division. His extensive laboratory experience, which has been acquired over a 34-year period, will now be utilized to expedite production, assist manufacturers and users of latex and dispersions products, and to solve production problems which may arise either in the sales department or for those using these materials. New developments will also come within the scope of his work.

Conductive Heating Pads

The pre-heating of gun breeches while airplanes are grounded or the maintenance of required temperatures of machine guns and aerial cannon for instantaneous use at high altitudes is made possible by the installation of conductive rubber heating pads. The pad, developed by the U. S. Rubber Co., prevents the jamming of these automatic guns resulting from the effects of extreme cold or sub-zero temperatures.

The heating pad is simple in construction. It consists of a cotton fabric impregnated with a special synthetic rubber compound which acts as the conductor. Two ordinary bare copper wires carry the power to opposite sides of this fabric. The desired amount of heat is then generated by electrical resistance. The whole unit is then covered with a synthetic rubber which insulates the pad against outside short circuit.

Vulcanization of these two, plus the addition of a standard aircraft coupling, completes the unit. The total weight of the heating unit is less than 3 ounces. Unit requirements for larger type guns are gauged according to specifications and will weigh slightly more.

The heater pad is cemented to the side of the breech of the gun with a specially developed rubber cement. This cement is applied with the brush method to the metal of the gun and the rubber heater at the same time. Partial coagulation of cement is allowed before the two are placed together. It is then rolled until complete bonding is accomplished. Once bonded, the unit remains attached to the gun breech irrespective of the degree of heat, either the gun or the unit itself may generate.

Additional "E" Awards

Included among companies receiving the Army-Navy "E" award in recent weeks for production efficiency were the following:

Arrowhead Rubber Co., Vernon, Calif.

Imperial Paper & Color Corp., Glens Falls, N. Y.

U. S. Asbestos Division, Raybestos-Manhattan, Inc., Manheim, Penna.

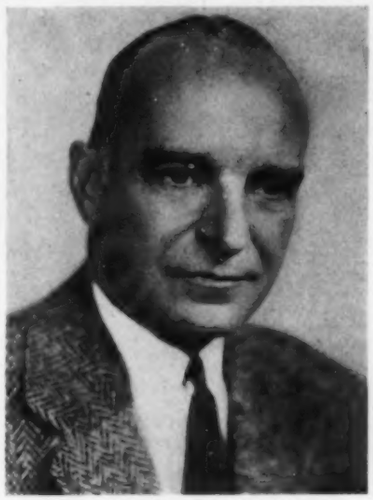
U. S. Rubber Co., Woonsocket Plant, Woonsocket, R. I.

A second white star, indicative of continued efficiency, was awarded to the Acushnet Process Co., New Bedford, Mass.

Training Films Released

One hundred and fifty new 1944 16-mm. sound motion pictures designed to aid in speeding up training of millions of workers in war plants have been released by the U. S. Office of Education. These films, produced by private companies for the government, are being released on a self-liquidating basis. For detailed information, index and prices of these training films manufacturers are urged to communicate with Castle Films, Inc., 30 Rockefeller Plaza, New York 20, N. Y.

Young Heads Rubber Trade



R. D. Young

R. D. Young, vice-president of the Rubber Reserve Co., and long a career man in governmental circles, has resigned from that position to become president of the Rubber Trade Association of New York, Inc., replacing A. L. Grant, vice-president of the Charles T. Wilson Co. Mr. Young will continue to serve Rubber Reserve in an advisory capacity. His connection with the Association, which maintains headquarters at 15 William St., New York 5, N. Y., is expected to result in closer cooperation between the Association and all branches of the rubber industry. It has also been announced that G. LeRoy Scheinler, of the Robert Badenhop Corp., was elected chairman of the board of the Association, a newly-created office.

Buys Into Colombia Firm

Through an investment in capital stock, the U. S. Rubber Co. has become associated with Compania Croydon del Pacifico, S.A., leading rubber manufacturing firm of Colombia, South America. The firm, which is located at Cali, now manufactures canvas rubber-soled shoes, molded goods, industrial rubber goods, and camelback. Ernest A. Leupin continues as general manager of the Croydon company and Alexander Watt, formerly branch manager for the U. S. Rubber Export Co. in Bogota, has been appointed sales manager.

R. I. Club Meets March 24

The Spring Meeting of the Rhode Island Rubber Club will be held at the Crown Hotel in Providence, R. I., on Friday, March 24. The meeting is planned to be devoted to an open forum discussion on plasticizers. Reservations for the meeting should be made with the secretary, James M. Scott, c/o Henry L. Scott Co., Providence, R. I.

Anaconda Officials Found Guilty

The Anaconda Wire & Cable Co. and four former officials of its Pawtucket, R. I., plant were found guilty of conspiring to defraud the government in the sale of defective wire to the Signal Corps between November 1, 1940, and September 1, 1942, by a Federal court and jury in Providence, R. I., on January 13. Although the company gave notice of an intent to appeal, it, as well as the officials involved, accepted the sentence of the court, handed down on January 18. William H. Morley and Jacob Eagleson, former manager and plant superintendent, respectively, of the Pawtucket plant, received sentences of 18 months each; Lowell K. Morrow, chief inspector, 15 months; and William Eagleson, testing room superintendent, a year and a day. Robert L. Wright, former chief engineer, who pleaded guilty during the trial and testified for the government, was placed on probation. The company was fined $10,000, the maximum penalty.

Status of Fabric Top Shoes

A fabric shoe manufacturing schedule of approximately 8,000,000 pair of lace-to-toe shoes, 4,000,000 pair of gym shoes, and 2,000,000 pair of training shoes has been authorized by the War Production Board for the rubber footwear industry. According to a recent statement by the Converse Rubber Co., Malden, Mass., this 14,000,000 pair production objective represents 50% of the pairage manufactured in the pre-war "normal" year of 1941. The statement pointed out that in view of the fact that the industry, due to man-power shortages and military needs, failed to meet by 10% its 1943 manufacturing schedule for waterproof rubber footwear the manufacture of rubber footwear must continue to get first consideration for what obviously will be an increased demand during the current year. Therefore, it is extremely doubtful whether the 14,000,000 pair schedule for fabric top shoes for 1944 can be met.

New Type Engine Mounting

Goodyear Tire & Rubber Co., Akron, has announced a new type of engine mounting which not only reduces the weight of big Flying Fortresses but also requires less rubber. The new mountings, which also reduce vibration in the plane, decrease the original weight of each Fortress by approximately 15 pounds. According to Goodyear engineers, they permit the engines of the Fortress to reach their vibration peak much earlier than other types of mountings. All the engine vibration is absorbed by a natural rubber sleeve in the mounting, nine of which are supplied for each engine. In addition, a knuckle in each mounting is of a plastic which eliminates any need for oiling or greasing.

LOS ANGELES NEWS

George Greene, of the Synthetic Rubber Products Company, located at 7838 Weld Street, Oakland, California, was a business visitor in Los Angeles for several days late in January and early in February. He attended the regular February supper meeting of the Los Angeles Rubber Group.

The B. F. Goodrich factory enlargement project, which will add 27,000 square feet of floor space to the plant, is moving along nicely and it is expected it will be completed in May. Part of the building is two stories in height and half is one story.

A. D. Nast, Jr., president of Western Insulated Wire, Inc., has returned to Los Angeles from England where he has been for some months as director of facilities for the Red Cross. Business had advanced to the point where his presence at the plant was quite essential.

Capatin Richard Vodra, a brother of Victor Vodra (R. T. Vanderbilt), who is active in the Los Angeles Rubber Group, a young man once employed by the Kirkhill Rubber Company, is back in California after having completed 220 combat missions in the South Pacific. As a fighter pilot he flew a P-38, a P-40 and a P-47. Young Captain Vodra is only 23 years old.

F. H. Banbury, inventor of the famed mixer that bears his name, has been spending the winter in Los Angeles and making his home at the Ambassador Hotel. He expects to leave about March 1 for his home in Connecticut.

W. J. "Bill" Haney, factory manager for the Kirkhill Rubber Company, and his wife have adopted a girl baby to which they have given the name of Suzan. Incidentally Mr. Haney has also recently purchased a very fine home in View Park, Los Angeles.

With appropriate ceremonies the Arrowhead Rubber Company was awarded the Army-Navy "E" on Friday, February 4. The company is owned by T. Kirk Hill.

Howard Lein and his brother are now back in charge of the Atlas Sponge Rubber Company at 806 East 61st Street and have the wheels turning very rapidly. The plant had been leased to the Kirkhill Rubber Company for some time.

Bob Grimes, of the Dill Manufacturing Company, ran into some cold weather during a recent trip to San Antonio, Texas. In fact he encountered a snow storm such as never is seen in sunny Southern California. He went to San Antonio to observe the operations of the Firestone test fleet. The snow storm incident was made all the more annoying by the fact that this was the first storm of the kind they had had in San Antonio for ten years.

R. B. Stringfield, of Consolidated-Vultee Aircraft, Inc., and Fred Woerner, of Los Angeles Standard Rubber, Inc., are instructors in a fifteen weeks course being offered at the University of Southern California on Monday evenings treating on the subject of "Design of Rubber and Synthetic Rubber Products." The courses began February 7 and consume three hours time, 7 to 10 P. M.

Vic Vodra, of R. T. Vanderbilt Co., Inc., and Herbert Wide are also giving of their time as instructors in courses relating to rubber and allied industries. The courses being offered are in connection with War Training, Engineering, Science and Management, sponsored by the United States Department of Education. All courses are given students without charge for tuition.

Charles H. Drew, vice-president of the Charles E. Francis Company, Rushville, Indiana, a brother of Phil Drew of the Goodyear Tire and Rubber Company, spent several days in Los Angeles recently attending to business and visiting his brother. Mr. Drew's company turns out hydraulic presses and coating equipment.

H. H. Vickrey, formerly active in the West American Rubber Company who has been in the armed service for a considerable time, is now a lieutenant-colonel and located at Boulder City.

Charles Lamb of the West American Rubber Company reports that his factory is now busy 24 hours per day with three shifts operating. Much work is being done with synthetic rubber.

The Golden State Rubber Mills has installed considerable miscellaneous machinery during recent weeks, according to Carl E. Stentz, and the plant was slated to go on a three-shift, 24 hour, basis.

Earl Stentz, father of Carl Stentz, who has been in charge of the Latex Seamless Products Company at 4620 East Washington Boulevard, has retired from the rubber game and will give his time to his ranch near Los Angeles in the future. Jack Mergill is now in charge of the plant under the direction of Carl Stentz. Dick Banta, formerly chief chemist for the Kirkhill Rubber Company, is now the chief chemist for the Golden State Rubber Mills.

George R. Steinbach, of H. M. Royal, Inc., is the father of a beautiful baby girl born November 9. The young lady, who weighed into this world at 6 lbs. 9 oz., has selected for herself the name of Margret and is already playing accompaniment to her little sister Marian.

The new Year Book of the Los Angeles Rubber Group is one of the best, the boys think, that has ever been produced in the country. George Steinbach worked evenings in order to rush the book to completion and he was ably assisted by the whole staff, determined to put out a book that would be a credit to the Group and to the industry. This was the first year that outside advertising was inserted in the book, a fact which not only yields an income but improves the general appearance.

The new plant of the Los Angeles Standard Rubber, Inc., located at 1500 East Gage Ave., was recently completed. The new brick building, which covers an area of 35,000 square feet, houses some of the most modern rubber manufacturing equipment in the West, including an up-to-date laboratory. Supervision of the company's several branches throughout Los Angeles will be directed from the new plant.

View of the new plant of Los Angeles Standard Rubber, Inc.

CANADIAN NEWS

It will be from one year to eighteen months before the general tire supply situation will reach the stage where the motoring public, other than those now on the essential list, will be able to secure synthetic tires, R. C. Berkinshaw of Toronto, president of the Polymer Corporation, told the Kent Motor Club at its annual meeting at Chatham, Ontario, on January 24.

He held out some hope, however, of the supply situation reaching the stage where the privileged or essential list of persons entitled to synthetic tires might be extended. The Sarnia, Ontario, plant of the corporation is now in the position where it can produce approximately 40,000 long tons of synthetic rubber, or enough to meet Canada's present military and essential rubber requirements.

He warned against the public entertaining the idea that now the synthetic plant was in full operation, the tire and other rubber supply problems had been overcome. He said there were still many difficulties to be ironed out before synthetic rubber processing was perfected.

Mr. Berkinshaw estimated that approximately 60 per cent of the program of conversion for uses of synthetic rubber has been completed. In some instances, especially footwear, the conversion has reached 90 per cent. The public have been using and wearing synthetic rubber products for some time, and in most cases they have been unaware of it.

"There has been much conjecture as to the postwar possibilities of synthetic rubber," Mr. Berkinshaw continued. "I think the product has a definite place in the postwar world, although it will have to stand on its own feet in competition with natural rubber products. Indications are that it can be produced at reasonable cost, and in some instances answers requirements better than raw rubber products."

Canadian-produced poorer grade reclaim and scrap rubber now may be used in the manufacture of civilian goods, Hon. C. D. Howe, Minister of Munitions and Supply, announced on January 13. "The use of poorer grade reclaim and scrap rubber has been freed from restrictions, and these materials now may be used in the manufacture of any civilian article," said Mr. Howe.

The Minister defined the rubber materials now available for civilian use as "reclaimed and scrap rubber which have a rubber hydrocarbon content of 45 per cent or less of the total weight, and scrap rubber obtained from tire buffing."

Possibility emerges that the Dow Chemical Company of Canada which already is operating two units at the Polymer Corporation may extend its operations in the Sarnia, Ontario, area, to include the production of chemical products for which the parent company at Midland, Michigan, is noted. George Hemmerick, general manager and treasurer of the Canadian company, said in Sarnia, the company was looking over the Canadian field with a view to ascertaining whether the time was ripe to extend the operations of the parent company in this country.

Whether there would be any immediate developments from the study being made was problematical, Mr. Hemmerick said, as the situation had been considered off and on during the past five or six years. The study of the matter therefore antedated the establishment of the Dow Chemical branch of the Sarnia synthetic rubber plant which was conceived since the outbreak of the war.

On various occasions reports have been circulated that one or more industries might be established in Sarnia to make plastics as an offshoot of the rubber plant. Other reports have involved the establishment of branch plants there by leading rubber companies to make new lines of rubber goods made possible from the products of the rubber plant.

Net earnings of The Goodyear Tire & Rubber Co. of Canada in 1943 covered all dividends for the year, A. G. Partridge, president, informs shareholders in a letter accompanying current dividend checks. Dividends for 1943 included the regular annual dividend of $2.50 per share on the preferred stock of $50 par and regular and extras aggregating $4.50 a share on the common. In the preceding year regulars and extras amounting to $5 a share were paid on the common.

Decline is reported by the Seiberling Rubber Company of Canada in the fiscal year ended October 31, 1943, with net profit of $64,213, after depreciation, taxes, etc., equal to $2.05 a share. This compares with $92,552 or $2.95 in the previous year. Previous surplus stood at $272,454. Earned surplus at October 31, 1943, amounted to $330,205.

The report shows current assets of $1,367,726 and current liabilities of $1,376,954, leaving a deficit in working capital of $9,228, compared with deficit working capital of $31,054 at the previous year-end.

1943 RUBBER RED BOOK

Copies of this complete Directory of the Rubber Industry are now available. Price: $5.00 each.

Head of R. I. Rubber Club

Owen E. Lowe

Owen E. Lowe, research chemist of the Davol Rubber Co., Providence, R. I., whose likeness is reproduced above, is the new president of the Rhode Island Rubber Club, as reported in our last issue. Born in Lunenburg County, Nova Scotia, on February 10, 1905, Mr. Lowe became a naturalized citizen of the United States and received his education in the public schools of Brockton, Mass. He was graduated from Rhode Island State College, class of '27, as a chemical engineer, and was employed in the laboratory of the U. S. Rubber plant at Bristol, R. I., for a short time before joining Davol Rubber sixteen years ago. Mr. Lowe is married, and has a nine-year-old daughter and six-year-old twins, a boy and a girl. His hobbies include photography, golfing, cabinet making and mathematics. He is a member of the A.C.S., as well as of its Rubber Division and the Boston Rubber Group. He is, of course, also a member of the Rhode Island Rubber Club.

Standard Resins Classified

The para coumarone indene resins manufactured by the Pennsylvania Industrial Chemical Corporation and distributed by the Standard Chemical Co., Akron 8, Ohio, have been classified into two groups by the latter company for the benefit and convenience of the rubber and plastics trades. These resins are now identified by color and melting point, as follows: Picco 10, 25 and 100 identifies resins for light colored compounds while Bunarex 10, 25 and 100 identifies those for dark colored compounds. The number indicates melting point, centigrade (ball and ring methods). These six numbers, according to the company, will meet practically every compounding need, but if intermediate colors or melting points are required for special purposes they will continue to be supplied.

OBITUARIES

W. Edwin Palmer

W. Edwin Palmer, secretary and assistant treasurer of the Seiberling Rubber Co. and a pioneer of the American rubber industry, died in Akron (Ohio) City Hospital on January 25 after a short illness following an operation. He was 69 years of age.

Mr. Palmer's death ended a 46-year association with the Seiberling family. He joined F. A. and C. W. Seiberling when they founded the Goodyear Tire & Rubber Co. in 1898, and was elected secretary and assistant treasurer of that company shortly thereafter. When Goodyear was reorganized in 1921 and the Seiberlings resigned to found the present Seiberling Rubber Co., Mr. Palmer went with them as secretary and assistant treasurer, holding that position until his death.

Born in Hudson, Ohio, on August 31, 1874, Mr. Palmer came to Akron at the age of 21 and worked in local department stores as a bookkeeper. Before joining the Seiberlings in their first rubber venture, he worked for the late E. A. Pflueger when the latter organized his own fishing tackle manufacturing firm, later merged with the Enterprise Manufacturing Co.

Active in Masonic circles, Mr. Palmer was one of only five men in the Akron area to hold the 33rd degree of Masonry. He held virtually every state and city office in the Ohio organization, and at the time of his death was Grand Recorder for Ohio Knights Templar. He was also chairman of the board of trustees of the Masonic home at Springfield, Ohio.

Funeral services were held in Akron on January 28, with interment in Rose Hill Cemetery. Mr. Palmer leaves his widow, Gertrude, one son, E. J. Palmer, and four grandchildren, the sons of H. P. Schrank, vice-president in charge of production of Seiberling Rubber, and his daughter, Kathryn, who died in 1939.

Arthur D. Kunze

Arthur D. Kunze, associated with the Rubber Manufacturers Association since January, 1920, as an assistant secretary, and widely known in mechanical rubber goods circles, died at his home in Hastings-on-Hudson, N. Y., on February 1. He had been in poor health for the past six months. Mr. Kunze was 44 years of age.

Born in Hastings-on-Hudson, Mr. Kunze received his education at the local public and high schools and was associated with the traffic department of the New York Central Railroad for a short time before joining the R.M.A. At one time he left the Association for a brief period to work in the mechanical goods division of the U. S. Rubber Co.

Practically all of Mr. Kunze's work was connected with mechanical goods and he was a recognized authority in this field. During the days of N.R.A., he was secretary of the Mechanical Goods Code Authority and later served as advisor on mechanical goods to the Office of Emergency Management. In recent years he spent a good deal of time at Washington, D. C., in the interests of mechanical goods manufacturers.

Funeral services were held in Hastings-on-Hudson on February 4. A widow, two sons, one a naval air cadet, and a daughter survive.

Ward C. Pearl

Ward C. Pearl, one of the founders and for twenty-two years president of the American Mineral Spirits Co., died recently from a heart attack suffered in Chicago. He was 51 years of age. Mr. Pearl began his career in the petroleum refining and marketing industry with the Keystone Refining Co. In 1921, with two associates, he organized American Mineral Spirits and served as president of the concern from its inception until his death. A widow and one son survive.

Elisha H. Small

Elisha H. Small, president of Small Brothers, narrow fabric manufacturers of Fall River, Mass., died at his home in Fall River on January 17 at the age of 81. Mr. Small was born in Provincetown, Mass., and came to Fall River in 1872, receiving his education in the local public schools. He entered the textile field as a youth and remained in that field all of his life. He was a member of the board of directors of the Carr Manufacturing Co., Bristol, R. I., and of the Fall River Trust Co.

J. M. S. Carroll

J. M. S. Carroll, manager of the mechanical sales department of the Dominion Rubber Co., Ltd., Montreal, Canada, died recently. Mr. Carroll, who was widely known in general industrial circles throughout the Dominion, joined Dominion Rubber in 1903 and in 1905 became Eastern Division Manager. A few years later he was advanced to the post he held at the time of his death.

Who makes camelback? Belting? Footwear? The answers are in the 1943 RUBBER RED BOOK. Price: $5.00.

Gibson Island Conferences

The special research conferences held at Gibson Island under the auspices of the American Association for the Advancement of Science will be continued this summer with conferences scheduled for the weeks of June 12 through August 21. They will cover work in the fields of organic high polymers, catalysis, petroleum chemistry, instrumentation, and others. Papers scheduled for the Conference on Organic High Polymers follow:

June 26: *The Electron Microscope as Research Tool for High Polymers* (speaker to be announced); *X-rays and High Polymers*, by I. Fankuchen.

June 27: *Infrared Spectroscopy and High Polymers*, by R. B. Barnes; *The Ultracentrifuge as a Research Tool in the Field of Organic High Polymers*, by C. Beckman.

June 28: *Copolymerization*, by F. T. Wall; *Fatigue and Aging of High Polymers*, by W. E. Roseveare; *Fundamental Aspects of Mechanical Testing*, by H. F. Wakefield.

June 29: *Viscosity, Osmotic Pressure, Molecular Weight, and Internal Structure of High Polymers*, by H. M. Spurlin; *Fractionation of High Polymers*, by S. Coppick; *Chemical Determination of Chain Length*, by M. Harris.

June 30: *Light Scattering in Solutions of High Polymers*, by P. Debye.

Full information on any phase of the Gibson Island Conferences may be secured from Neil E. Gordon, Department of Chemistry, Wayne University, Detroit 1, Mich.

Beacon Introduces New Oil

Propylene Laurate, a light amber, edible, non-hygroscopic oil, has been introduced by the Beacon Company, Boston, Mass. The oil is claimed to be completely dispersible in water, forming milky emulsions whose viscosity can be controlled. According to the manufacturer, it is miscible with alcohol, polyhydric alcohols, glycerine, glycol, hydrocarbons, solvents, oils, etc., possesses high boiling qualities, has a pH of 5% aqueous dispersion 8.0, is non-toxic and practically odorless. It is believed that manufacturers of emulsions for wood, leather and metals will be interested in Propylene Laurate's emulsifying action in oils, oil soluble dyes, hydrocarbons, etc.

Buys Wisconsin Rubber Firm

E. M. Darnell, who has been general manager of Druley's Research Products, Prescott, Wisconsin, has announced that he has purchased the business conducted under that name and that the business will be continued in the future under the name of St. Croix Rubber Products. The new company will continue the design and manufacture of rubber and other products in Prescott.

NEW EQUIPMENT

New EEMCO Laboratory Mill

A new laboratory mill for rubber and plastics, completely modern in design, has been developed by the Erie Engine & Manufacturing Co., Erie, Penna. The new EEMCO laboratory mill is equipped with two 6-inch diameter by 12-inch chilled iron rolls of top

quality, cored for heating or cooling. The frame of the mill is made of semi-steel and constructed in one piece. The journal boxes are also of semi-steel, lined with special bronze bushings. Cut spur connecting gears are standard equipment throughout. The drive sprocket is three strand, three-quarter pitch for roller chain. The drive consists of a Reeves variable speed motor drive complete with a 5 h.p., 220-volt, 3-phase, 60-cycle motor and a 75-foot pound Stearns magnetic brake mounted on the variable speed shaft with switch. The output shaft speed is from 208-104 r.p.m. infinitely variable, with a 2-to-1 three strand, three-quarter pitch, roller chain drive to back roll.

Porter Side Entering Agitator

A new side entering agitator, which can be repacked from the outside without draining the tank and without loss of liquid, has been introduced by H. K. Porter Company, Inc., Pittsburgh, Pa. So important are the advantages incorporated, that the company is in process of replacing its entire standard line of agitators, from ½ to 30 horsepower, with the new design.

The outside repacking can be done in 5 minutes, saving many man hours, and the expense of draining the tank, airblowing it in cases where toxic fumes make this necessary to permit a workman to enter, and then pumping back the fluid after the packing has been replaced. This is accomplished by using an external packing gland, while a seal attached to the shaft inside the tank may be drawn into a seat, hermetically sealing off the contents of the tank and permitting repacking with the tank full and no loss of liquid.

The new agitator has been completely reengineered and contains many other valuable features. All thrust

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is taken off the motor bearings by means of roller bearings operating against a ring attached to the shaft. This results in longer life for the motor gears and consequently for the motor. Also, by means of undercuts, the designers have made it impossible for leakage to get at the bearings, not only adding to their life but simplifying lubrication and eliminating the need for special lubricants.

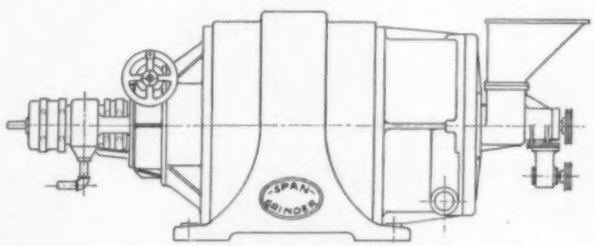
The new unit is also completely weatherproofed with all moving parts protected from the elements, and can be installed outdoors with entire assurance. Motor base and cowl are integrally mounted to agitator, and the unit is equipped with an adjustable support under motor base. Hinged weather-proof cowl on motor gives easy access to motor.

Exhaustive tests with kerosene and other liquids under much higher pressures than in actual operations have conclusively demonstrated that complete sealing is obtained under all conditions, as well as the practicality of other features.

Improved Type Span Grinder

An improved grinding machine, built for heavy duty and large-scale production, has been announced by M. Pancorbo, 155 John St., New York 7, N. Y. Known as the Span Grinder Type X, the new grinder incorporates improvements suggested in years of experience of specialization in the manufacture of scrap rubber grinding machines. It is entirely automatic, requires little attention, and operates at low cost.

The new model is powered by a special 50 h.p. motor built in as part of the machine. It features direct drive with extra heavy-duty shaft and has no gears. pulleys or belts. The capacity of the grinder, which measures 33 x 74 inches in dimensions, ranges from



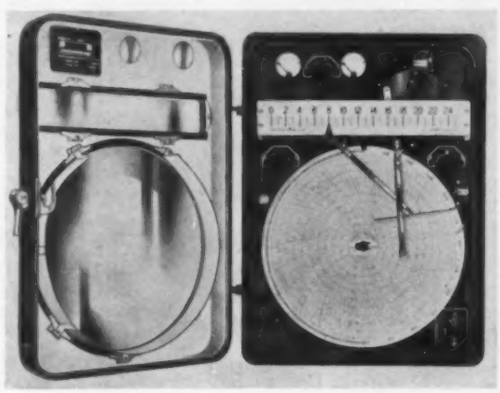
Span Grinder Type X

400 to 800 pounds of scrap rubber per hour, depending on the consistency of the material used and fineness desired. The feeding device is easily regulated and a gauge is provided which shows the power used so that the machine can be operated at capacity using full motor power without overloading irrespective of the kind of material being ground.

Since the discharge mechanism of the new model is entirely covered and the material is removed by connecting a blower, its operation is dust-free. Because of an improved water cooling system this model can be operated continuously without overheating. To secure coarser or finer rubber dust, as required, a turn of a wheel changes the space between discs.

New Bristol Pyromaster Potentiometer

The Pyromaster Self-Balancing Potentiometer featured by the Bristol Co., Waterbury 91, Conn., has been completely redesigned. The newly-designed instrument, known as Model 431, has a universal wall or flush mounting case that is considerably deeper than the previous Model 440M, and has an internal hinged



panel on which are mounted pen and indicator drive mechanism, and, in the case of electric controllers, the control contacts or proportioning slide wire, or in the case of air control, the complete new convertible-type air operated control mechanism. This new deep case and inner panel make it possible to service or replace any part or portion of the instrument without disturbing any other part. It also makes it possible, in the case of electric type controllers, to include the control relays in the instrument.

A heavy-duty pen-drive motor gives more torque for operating control contacts and other similar functions, especially under conditions of poor line voltage regulation. The indicating scale on the indicating-recording model has been changed to a horizontal wide band instead of the rectangular dial-type provided on the Model 440M. The stepping relays and the slide wire in the potentiometer circuit have been enclosed in a dust-proof Bakelite housing, and a heavier power supply has been provided. Another change is that a standard cell type of manual standardizing circuit now replaces the voltmeter type originally supplied.

The Model 431 Pyromaster uses the same basic principle as previous models, providing a self-balancing round-chart recording potentiometer that has no continuously moving mechanical elements, is unaffected by vibration, and needs no lubrication.

A new battery-operated **insulation tester,** called Model 610-B, which instantaneously measures the exact leakage of all insulation from zero up to 200 megohms at a test potential of 500 volts D.C., has been introduced by the Superior Instruments Co., 227 Fulton St., New York 7, N. Y.

A rectangular **magnet for use in road sweeping operations** for the conservation of automobile, truck and bus tires has been designed by the Stearns Magnetic Mfg. Co., Milwaukee, Wisconsin. It is available in 18 inch standard width and in 60, 72, 84 and 95 inch lengths, depending on the width of the sweep desired.

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REVIEWS

BOOKS

The Story of Scrap Rubber. By Howard Wolf. Issued by A. Schulman, Inc., 790 East Tallmadge Ave., Akron 9, Ohio. 6 x 9 in. 112 pp.

Although a good deal of wordage has been devoted to practically every branch of the rubber industry in one form or another, very little has appeared on scrap rubber prior to the publication of this book. True, brief references to methods of handling, sorting and preparing scrap for the reclaimer have often been made in the literature, but no single complete treatise on the scrap rubber industry—an important adjunct of the over-all rubber industry in peacetime, doubly important in wartime—has heretofore been published. For this reason alone this new book is welcome. It serves to round out the literature on rubber.

As indicated by its title, the book tells the story of scrap rubber from its earliest beginnings, when the first rubber dealers appeared in the late 18th century in the guise of Portuguese sea captains, right through developing methods of handling synthetic scrap. The story is told in ten short chapters, which serve to bring the scrap rubber plant to the reader, textually and pictorially. Because the history of scrap rubber is closely entwined with that of reclaiming, the book actually treats with both subjects as one, since they are closely interdependent historically.

Issued in connection with the fifteenth anniversary of the firm of A. Schulman, Inc., this book merits a place in every rubber library. It includes four appendices giving specifications for scrap rubber, crude and scrap rubber average prices over a period of years, and a discussion of the chief synthetic rubbers. Copies are available to the industry on letterhead request.

•

Handbook of Accounting Methods. Edited by J. K. Lasser. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y. 6 x 9 in. 1350 pp. $10.00.

Definite and complete accounting information on over 70 businesses and industries, representing every aspect of American economic activity, is presented in this book by an expert in the accounting of each particular type of business and industry. Each individual treatment gives all the details of the accounting, costing and systems processes, as well as the most up-to-date coverage of the tax laws and Fedearl regulations, applied specifically to the accounting of each business and industry. The book is divided into four sections: (1) How to Design an Accounting System; (2) Records Required for Tax and Other Legislation; (3) Systems Used in the Specific Industries; and (4) Bibliography, containing references to material which permit continued study of accounting systems in specific industries. Hundreds of typical cases are cited. There is an extensive, cross-referenced subject index.

•

Producing for War—Preparing for Peace. Firestone Tire & Rubber Co., Akron, Ohio. 8½ x 10½ in. 36 pp.

What Firestone is doing to help win the war and what some of its plans are for the production of civilian goods when peace has been declared are outlined in this new booklet. Some of the myriad products produced by the company for the Armed Forces, including life rafts, vests, tires, gliders, gas masks, tank gun turrets, trench mortar bases, spark plugs, helmets, fuel cells, pilot seats, high-altitude oxygen tanks, and airplane parts, are illustrated. Post-war plans call for the manufacture and distribution of Velon, Contro, Foamex, metal alloy and rubber-to-metal products. The book is attractively printed.

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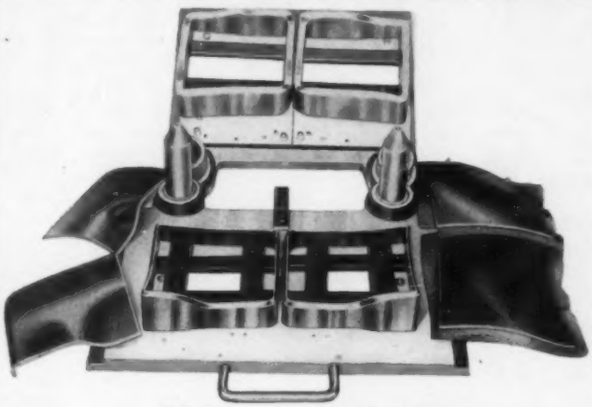

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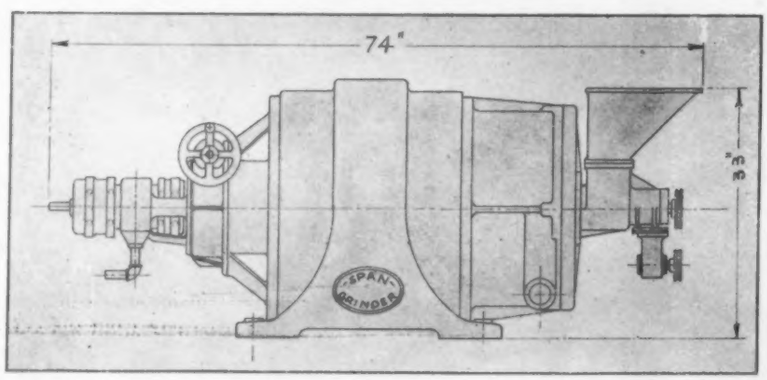

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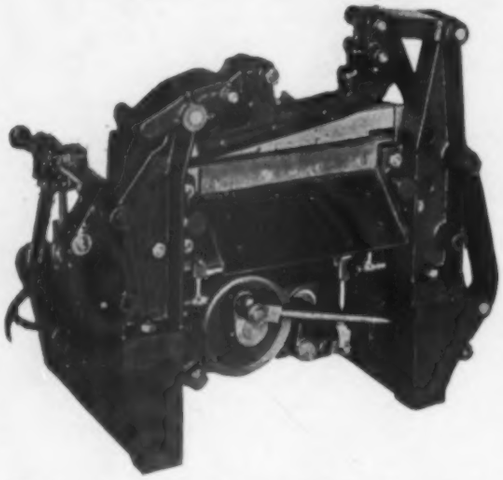

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REVIEWS (CONT'D)

Chemistry Made Easy. By Cornelia T. and Foster D. Snell. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 10, N. Y. 5¼ x 8 in. 4 Volumes. 1214 pp. $7.95.

These four volumes represent a self-study reading course in chemistry. Although designed especially for those who must or wish to learn by themselves, without teacher or laboratory, the volumes are also of value to chemists who want to review the principles of chemistry and their countless practical applications.

Volume I treats with "The Theory of Inorganic Chemistry" and covers the nature of chemical elements and compounds, explaining their chemical reactions. Volume II is entitled "Elements and Compounds in Inorganic Chemistry" and delves more deeply into the fundamental chemical reactions. Volume III is called "Aliphatic and Aromatic Compounds of Organic Chemistry" and covers the whole range of organic chemistry. Volume IV is termed "Chemicals of Commerce" and is a corrected and enlarged version of the book of the same title published by Van Nostrand in 1939 giving the composition, properties, uses, relative costs and other information of numerous chemical materials.

Each lesson in these volumes constitutes simple, straight-from-the-shoulder instruction in plain English on a single chemical subject, with all necessary formulas, diagrams and questions. A complete final examination, with answers and a grading system, is provided at the end of each volume.

•

Plastics Catalog: 1944. Published by Plastics Catalogue Corp., 122 East 42nd St., New York 17, N. Y. 8½ x 11½ in. 990 pp. $6.00.

The history and achievements of plastics materials in every branch of industry are brought up-to-date in this latest edition of the "encylopedia of plastics." In addition to listing data on plant and personnel of the industry, the current edition is replete with information of special importance, including 40 selected war case histories representing typical plastics developments used by the various branches of the Armed Forces. Other sections are devoted to tests and specifications, materials, engineering and molding, fabricating and finishing, machinery and equipment, laminates, coatings, synthetic fibers and, finally, synthetic rubber and rubber-like plastics. This latter section has been expanded to 40 pages and furnishes data on the butadiene, chloroprene and isobutene-diolefin polymers and copolymers, as well as on organic polysulfides, isobutene and vinyl polymers, elastomeric styrene derivatives, polyester elastomers, vulcanizable vegetable oil polymers, and cyclorubbers. Included also is a chart outlining the properties of the various synthetic rubbers and rubber-like materials. The contents of this latest plastics catalog are truly encyclopedic in scope.

•

1944 Yearbook. Los Angeles Rubber Group, Inc., Mayfair Hotel, Los Angeles, Calif. 8½ x 11 in. 24 pp.

Dedicated to "the chemists and compounders who are shouldering a full share of the conversion from natural to synthetic rubbers," the latest edition of the Yearbook issued by the Los Angeles Rubber Group is the largest published to date. Like previous editions, it includes a list of officers, committee members and the group's full membership, in addition to lists of rubber manufacturers and suppliers on the Pacific Coast, the latter taken largely from the current edition of the RUBBER RED BOOK. Also included is a list of synthetic rubbers, identified by chemical designation and supplier, as well as a list of the plants producing GR-S, and their operators, in the Rubber Reserve program. The carbon black nomenclature recently approved by the Office of the Rubber Director is also shown. Finally, the current edition reviews the group's activities, meeting by meeting, in 1943; contains a full page description of last summer's outing at the Uplifters Club in Santa Monica; and reproduces the latest by-laws. Advertising was accepted for the first time.

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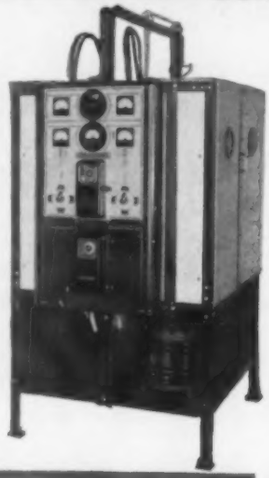

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REVIEWS (CONT'D)

1943 Wage and Hour Manual. Published by the Bureau of National Affairs, Inc., 2201 M St., N.W., Washington, D. C., 6 x 9 in. 740 pp. $7.50.

The issuance of the economic stabilization, premium pay and minimum workweek orders last year made necessary a completely new set of rules and regulations which were pyramided upon those previously established under the Wage and Hour Law. This book is a comprehensive guide to these new controls. Included are more than 1,000 rulings and interpretations relating to wages, salaries and hours of work, all correlated with others in both this new manual and the 1942 edition of the same series by means of frequent cross references and the liberal use of editors' notes.

Following the style of earlier editions, the current manual is divided into four parts, the first including all changes made since March, 1942, in controls under the Fair Labor Standards Act; the second and third containing similar material under the Public Contracts Act and a group of miscellaneous Federal statutes relating to wages and hours; and the fourth containing the text of all statutory and regulatory material, as well as analytical articles on wage and salary stabilization, premium pay regulation, and the minimum wartime workweek. A topical index, printed on colored paper stock, is included.

●

Intergovernmental Commodity Control Agreements. Published by the International Labour Office, 3480 University St., Montreal, Canada. 7 x 10¼ in. 221 pp. $2.00 (paper); $3.00 (cloth).

This is a collection of the texts of the existing intergovernmental commodity control agreements, and of extracts from the principal international pronouncements on commodity control policy. The latter are introduced by a preliminary discussion of some of the social issues which the control schemes present. The International Rubber Regulation Agreement, which went into effect on May 7, 1934, is reproduced in full. This agreement is currently in the midst of change and is being maintained only until such time as a new agreement, with wider international implications, can be drawn up and approved. The publishers have issued this volume in the hope that it may be serviceable during the discussion of commodity control arrangements for the post-war period. In addition to rubber, texts covering wheat, sugar, tea, coffee, beef, tin and cotton agreements are given.

●

Technical Data on Plastic Materials. Prepared by Plastics Materials Manufacturers Association, Tower Building, Washington, D. C. 8½ x 11 in. 141 pp. $1.50.

The nature, particular merits and utility of various plastic materials, together with their property values as measured by recognized methods, are outlined in this manual, prepared by the P.M.M.A. as a service to the representatives of governmental agencies concerned with the use of plastics materials in the war effort. Brief, explanatory forewords are followed by tables and charts of more detailed data. For simplification, individual materials very similar in composition and properties have been considered as members of groups or types for which data is given. Materials for which data is given include casein plastic, ethyl celluloses, phenol-formaldehyde molding materials, polystyrenes, vinylidene chloride, and vinyl chloride-acetate resin compounds. A list of member companies is also included.

●

Channel Blacks in Butyl Rubber (Report GR-I No. 1). Continental Carbon Co., 311 Peoples Bank Bldg., Akron, Ohio. 9 x 11½ in. 9 pp.

Results of physical tests on eight different Continental channel blacks in a typical GR-I stock are given in this technical report. Information on stress-strain behavior, rate of cure, hardness, tear resistance, resilience, resistance to heat development, abrasion resistance, electrical resistance, and processing characteristics are given. Loadings in all cases were 50 parts of black.

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BOOKLETS, CATALOGS, Etc.

How to Select and Specify Meyercord Decalcomania Nameplates. Meyercord Co., 5323 West Lake St., Chicago, Ill. 9 x 11¼ in. 4 pp.

This is an informative check-chart showing how to select and specify the correct decalcomania nameplate for 16 different types of surfaces. It also contains a check-list of 25 wartime uses for the company's Decals. The chart illustrates actual nameplates and describes application methods, types and uses, as well as special features of these nameplates. Applications, uses and features of Elasti-Cals, developed by the company for use on cured and uncured rubber, and which are adaptable to Vinylite and related plastics, are included in the chart.

•

Speed Case and Speed Treat Plate. (Catalog No. 1243). Speed Case Plate Division, W. J. Holliday & Co., Hammond, Indiana. 8½ x 11 in. 32 pp.

This bulletin pictorially and textually amounts to a scientific treatise on two carbon steels—Speed Case and Speed Treat—developed by the company, both of which find application in the rubber industry, particularly in the manufacture of mechanical goods molds and general machinery parts. Numerous photographs showing the actual application of these steels in abrasive wheel plates, printing presses, machine tool parts, deep cavity molds for plastics, lathes, jacks and many others, are reproduced in the bulletin. A good deal of technical data is also included.

•

GR-S Solvent Cements with Bondogen. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. 8½ x 11¼ in. 8 pp.

The advantages to be obtained by the use of Bondogen in GR-S naphtha cements and spreader doughs are emphasized in this laboratory report. Results of viscosity tests of pure gum and compounded brushing cements containing low solids and a spreader dough containing high solids, made with and without Bondogen, are compared. One conclusion drawn from the tests is that the addition of 0.5% by volume of Bondogen to the solvent greatly lowers the viscosity of a GR-S pure gum cement, producing good brushing consistency starting with unbroken GR-S.

•

Modern pH and Chlorine Control. W. A. Taylor & Co., 7300 York Road, Baltimore 4, Md. 5 x 8 in. 84 pp.

This revised combination handbook and catalog is of value to those interested in control of pH (acidity and alkalinity), chlorine, phosphates in boiler water, and in water analysis. It contains a simple, non-technical explanation of the meaning of pH control and the methods for making colorimetric determinations; precautions to be observed; a discussion of the application of pH and chlorine control to 31 different fields; and a technical discussion of the meaning of pH control. Descriptions of Taylor Slide Comparators are included.

•

Rubberized and Rubber Coated Fabrics. R.B.H. Dispersions, Inc., Bound Brook, N. J. 4½ x 7 in. 12 pp.

The Technical Section of the January, 1944, issue of *R.B.H. Dispersions,* a technical bulletin issued monthly by the company for executives and technicians of the coatings industry, is devoted to a discussion of rubberized and rubber coated fabrics. The history of this phase of the industry is reviewed from the experiments of Hancock in England through modern day methods. Diagrams of the Chaffee calender, the Hancock spreader, and a modern, standard spreader are included.

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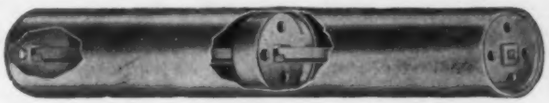

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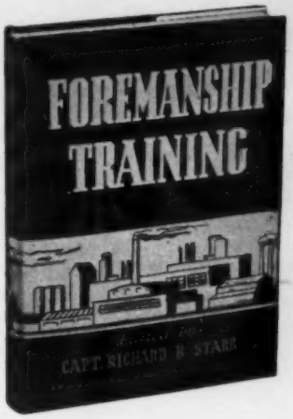

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, Feb. 11, 1944

Crude Rubber

OF SPECIAL interest during the past few weeks was the official announcement that the Rubber Development Corporation had turned over rubber procurement efforts in Brazil to the authorities of that country. At the same time it was announced that a premium of 15c a pound over the previously agreed-upon price of 45c a pound for fine acre will be paid to Brazil for a specified period. In turn, Brazil has taken over "some of the obligations" incurred in that country by Rubber Development.

The move was not entirely unexpected in rubber circles in view of the disappointing results achieved to date in the amount of rubber which has been received from the Amazon under the five-year agreement. This rubber, secured at a cost of $1.12 a pound, according to the figures recently made public by Douglas Allen, head of Rubber Development, was less than estimated amounts. Whether increased shipments will accrue from the new set-up remains to be seen, although Brazilian rubber authorities are quite confident that they can step them up considerably with the new price incentive.

It was also reported that consideration is being given to allowing premium prices for specified periods for rubber from some of the other Latin American countries with which special agreements are in effect. Payment of the premium will depend on whether in the opinion of the experts such payment would be likely to result in increased production and shipment. No decisions were announced by this writing.

Prices shown below are those set by the Rubber Reserve Company:

	C	N-C
Plantations—		
Ribbed Smoked Sheets, 1X	22½	40
Thick Pale Latex Crepe, 1X	22½	40
Thin Pale Latex Crepe, 1X	22½	40
Thick Brown Crepe, 1X	21⅜	38⅞
Thin Brown Crepe, 1X	21⅜	38⅞
Thick Remilled Blankets, #1	21⅜	38⅞
Rolled Brown or Flat Bark	18	35½
Smoked Blankets, #1	21¼	38⅝
Claro Brand 1XRSS	22½	40
Sole Crepe Trimmings	22	39½
Sole Crepe	22½	40
Wild—		
Uncut Fines, Crude	15	29
Cut Fines, Crude	15½	29⅜
Cut Fines, Washed & Dried	22½	40
Upriver Coarse, Crude	12⅝	26⅛
Upriver Coarse, Washed & Dried	20¼	37¾
Caucho Ball, Crude	11⅝	24¾
Caucho Ball, Washed & Dried	19½	37
Guayule—		
Carload Lots	17½	31
Less than Carload Lots	18	31½
Balata—		
Surinam Sheet	42½	42½
Manaos Block	38¾	38¾
Colombian Block	38¾	38¾
Peruvian Prime	38¾	38¾
Chicken Wire	23¾	23¾
Latex—		
Normal, Tank Car Lots	26	43½
Creamed, Tank Car Lots	26¾	44⅛
Centrifuged, Tank Car Lots	27¾	45¾
Heat-Concentrated, Carload Drums	29½	47

C, for Civilian Use; N-C, for Non-Civilian Use.

Scrap Rubber

Considerable criticism of the scrap rubber piles still stored in various sections of the country as a result of the nation-wide collection campaign launched late in 1942 was leveled at the authorities last month. It was quickly explained that these authorities, and particularly scrap rubber dealers and reclaimers, were aware of the fact that a good deal of the scrap likely to be turned in would be unusable, but in view of the urgency of the situation which then applied the nation-wide over-all campaign was justified. In this respect, Rubber Director Dewey issued a statement in which he stated that the 750,000 tons of scrap rubber turned in by the public was being used at the rate of 35,000 tons per month and of the total amount collected "at least 75% has proved to be one of the most important factors in tiding the nation over the rubber shortage." Scrap rubber supplies continue to be plentiful.

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$20.00
Beadless truck tires	ton	26.00
Mixed truck tires	ton	20.00
Beadless passenger tires	ton	26.00
No. 1 passenger peelings	ton	52.25
No. 1 truck peelings	ton	52.25
No. 2 passenger tubes	lb.	.07¾
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06¾
Mixed passenger tubes	lb.	.06½
No. 2 truck tubes	lb.	.07½
Red truck tubes	lb.	.07¾
Black truck tubes	lb.	.06½
Buffings	ton	35.00
Bicycle tires	ton	15.00
Air bags and water bags	ton	15.00
Boots and shoes	ton	33.00

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15, 1942.

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.43½ @	.44
Peeler, carded, 23/4/3	lb.	.44½ @	.45
Peeler, carded, 15/3/3	lb.	.41½ @	.42
Peeler, carded, 15/4/2	lb.	.41½ @	.42
Peeler, carded, 13/3/3	lb.	.40½ @	.41
CHAFERS			
Carded, American, 1 1/16"	lb.	.43½ @	.44
Carded, American, 1"	lb.	.39½ @	.48

Sheetings

48x40	36 in.	5.50	lb.	—	@ 7.818
40x40	36 in.	6.15	lb.	—	@ 6.991
40x36	36 in.	6.50	lb.	—	@ 6.615
48x48	40 in.	2.50	lb.	—	@16.200
48x48	40 in.	2.85	lb.	—	@14.210
56x60	40 in.	3.60	lb.	—	@11.944
48x44	40 in.	3.75	lb.	—	@11.066

Note: Prices shown above are ceiling prices set by order of the O.P.A. Quotations are based on an average price of 15-16-inch middling cotton of 20.37c at the ten designated southern markets.

Cotton

The price of middling uplands on the Cotton Exchange has moved in a 70 point range since our last report, high for the period being 21.31 today (February 11), and low 20.61 on January 14. The average price for the month of January was 20.76, based on 25 trading days. An upward trend began in mid-January, based largely on buying by the trade and mills, and is still continuing at this writing. Strength was given to the market from time to time by special developments, such as the announcement on January 24 that the Food Distribution Administration had purchased 322,000 bales of raw cotton for Lend-Lease shipment, this purchase being made in the open market. Occasionally some hedging developed and the price slipped back a few points, but invariably increased mill buying brought it back and moved it ahead. Always wary of government action, the trade was gratified to receive assurance from Senator Bankhead on February 7 that there would be no imposition of ceilings on the price of cotton futures contracts on the New York Cotton Exchange. Quotations for middling uplands on the Exchange (old contract) follow:

	Jan. 7	February 11		
	Close	High	Low	Close
March	19.88	20.58	20.50	20.55
May	19.62	20.21	20.14	20.17
July	19.37	19.77	19.70	19.74

Reclaimed Rubber

Occasioned by the new restrictive orders on some of the synthetics, particularly neoprene, still further demand has resulted for reclaimed rubber from the trade. Interest in reclaim is pretty well spread over practically all branches of the industry, with camelback producers leading the list. Renewed interest from heel and sole manufacturers is also reported. Reclaimers continue their experiments on the reclaiming of the various synthetics, with no special difficulties reported. Prices shown below are ceilings on typical grades of reclaimed rubber:

Shoe				
Unwashed	lb.	.07	@	.07¼
Tube				
Black Tube	lb.	.11¼	@	.11½
Red Tube	lb.	.12	@	.12¼
Tires				
Black (acid process)	lb.	.07½	@	.07¾
Black, selected tires	lb.	.06½	@	.06¾
Truck, Heavy Gravity	lb.	.08½	@	.08¾
Miscellaneous				
Mechanical blends	lb.	.04½	@	.05½
White	lb.	.13	@	.13¼

Ducks

Enameling (single filling)	lb.	—	@	.44¼
Belting and Hose	lb.	—	@	.39
Single filling, A grade	lb.	—	@	.19¾
Double filling, A grade	lb.	—	@	.20¾

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RUBBER CHEMIST

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